ELECTRICAL REVIEW

June 22, 1945

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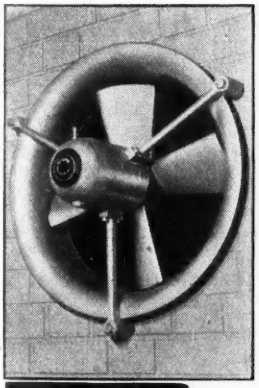

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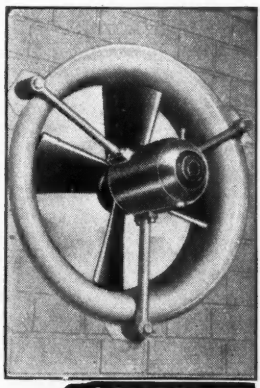

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

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Electricity Supply Position

Holding Companies and Public Ownership

THE formal business at last week's annual meeting of the I.M.E.A. occupied but a small proportion of the delegates' time. Most of it was taken up by debates on monopolies and the future ownership of supply undertakings in neither of which was a very high level reached.

As regards the first, the term " debate " is somewhat loosely applied for after the mover of the resolution had spoken at some length his motion (which called for an inquiry into the activities of holding companies) was briefly seconded and carried. There was no opposition; in fact the meeting seemed to be infected by the prevalent political fever and passively exhibited the one-sided character of the usual party gathering. Nobody therefore attempted to deflate the puffed-out bogey with which Mr. Davies of Tredegar attempted to chill the willing marrow of his audience's bones. His theme was the iniquities of holding companies but his choice of awful examples was not happy.

Summary Conviction

Edmundsons Electricity Corporation was one and, as Mr. Davies somewhat ruefully admitted, Lord Royden, Edmundsons chairman, had got his blow in first at the company's recent annual meeting. Mr. Davies did not go very deeply into the actual record of the group; he seemed to think that the very term " holding company " was enough to damn it. He would not have found his passage so easy in a more open meeting.

Turning to the General Electric Co. he was even more scathing but on no more certain ground. His main complaint was that by securing control of supply companies the G.E.C. obtained a ready-made market for its equipment and consumers had no choice. He gave the names of the companies involved but omitted to say anything of their size. The fact is that they are all very small concerns and if the G.E.C. relied on them as customers for any significant part of its output—well it wouldn't be the G.E.C. much longer.

Minister and Memoranda

To turn to the other debate. Ever since it came before the I.M.E.A. the " White Memorandum " on reorganisation prepared jointly by company and municipal supply authority representatives has been opposed by South Shields Corporation and some others. The Memorandum has, however, been officially approved by the I.M.E.A. although that Association has produced a set of proposals of its own (styled the " Brown Memorandum "). At the meeting the Corporation, through Councillor A. Stephenson, invited the Association to go back on this by agreeing to the rescission of Part III of the " White Memorandum," which meant complete evisceration. Decisions may be changed with changing circumstances but as the position in this regard is much the same as it was a year ago the majority of those present declined to make themselves look foolish and rejected the proposal.

The second part of the same resolution demanded that the Minister of Fuel and

Power should be informed of the disagreement in the industry and be asked to " seek the separate views of the various associations and groups." As all the world knows that the Minister has been receiving these separate views for the past year or two the object of this proposal was not clear and anyhow it had to give way to a more realistic amendment which still, however, as did the original, reaffirmed the Association's faith in public ownership.

Price Increases

IN spite of the enormous increase in the price of coal and practically everything else involved in the generation and distribution of electricity a tight hand has been kept on electricity charges. The rise in these has been extremely small as compared with all other commodities and services and this has been attributable largely to drafts on reserve funds to meet deficiencies. But reserve funds become exhausted in time and the Electricity Commissioners now appear to realise that the limit has been reached. They have told the I.M.E.A. that in future it will not be a condition of approval of increased charges that existing revenue balances or reserve funds should be drawn upon further, unless these reserves are substantial. Subject in general to a limit of 30 per cent. above the pre-war level, increases may be approved to the extent necessary to avoid a deficiency or even sufficient to allow for the partial restoration of reserves where these have been wholly or partly depleted, or for the provision of working capital.

Cliff Quay Power Station

SOME advance particulars of the 270,000-kW power station to be constructed for the Central Electricity Board by Ipswich Corporation are given on a later page. Speedy construction is evidently aimed at, since the first set will be required for public service in 1947. In the circumstances it is not surprising that the general design follows well-established practice. The height of the chimneys should be enough to eliminate any risk of offence on account of emissions from a station where some 1,500 tons of coal a day will be burned, while the publication of the name of the firm of architects retained to ensure that the architectural features harmonise with the landscape should silence any adverse criticism in that connection also.

Voltage-Drop Charts

As a means of avoiding tedious calculations that introduce risks of error, the opportunity of possessing charts, which have been worked out carefully in advance for quickly solving voltage-drop problems within the limits required for practical accuracy, will be welcome to transmission and distribution engineers. In this issue Mr. J. S. Forrest discusses the basic considerations governing the construction of charts of this kind. His article is intended as an introduction to the presentation in our columns, as space may permit, of a series of charts designed to meet any probable conditions at standard voltages.

Birthday Honours

ONCE again it cannot be said that the electrical world is over-represented in the Birthday Honours List published last week. There is one knighthood, that bestowed upon Mr. T. A. Eades of the Automatic Telephone & Electric Co., Ltd., who has been responsible for a great deal of wartime work and development. Sir Eugene Ramsden, Bt., who is raised to the peerage, is connected with the industry, notably in his directorship of B.I. Cables. It will be noted that the people in the list which we publish in this issue are practically all on the industrial side, many of them being engaged in research departments. In fact the whole list is a recognition of the importance of the industry's share in securing victory.

V1 or V2 ?

THE propulsion of aircraft, piloted or otherwise, by gas turbines has stimulated inquiry concerning their potentialities for the generation of electricity on a large scale. Although improvements in turbine and compressor efficiencies have increased the margin available for the production of power, it has yet to be shown that the higher metal temperatures associated with recent developments would be feasible under commercial conditions. A useful life of about twenty years with reasonable maintenance costs is requisite for machines with outputs and efficiencies comparable with those obtainable with modern steam turbines. An alternative speculation that would permit the retention of steam turbines is suggested by the generation of superheated steam through the chemical reaction of two liquids (without introducing fire risks) for driving the jet-fuel pumps of V2 rockets.

I.M.E.A. Meeting

Discussion on Public Ownership

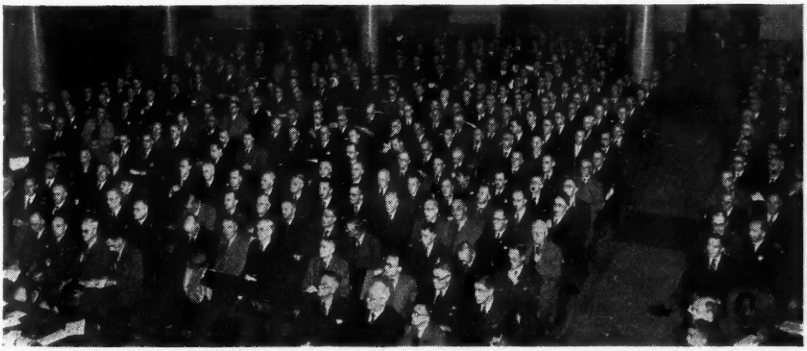
WHAT, it is hoped, will be the last of the "austerity" meetings of the Incorporated Municipal Electrical Association was held at the Kingsway Hall, London, on Thursday last week. MR. W. P. LILWALL (president) took the chair and in introducing the report (*Electrical Review*, June 15th, p. 859) said that although the Association had done nothing spectacular during the past year it had made solid progress. This was the year of victory in Europe and it also marked the Association's jubilee. During that fifty years the I.M.E.A. had done tremendous work in the public service. This year a local authority representative would become president for the first time and it was fitting that the office should be occupied by Alderman Sir William Walker who had done so much for the electrical industry, particularly in securing fair dealing between employers and employed.

SIR WILLIAM WALKER seconded the adoption of the report. There were few questions. MR. P. CLEGG (Macclesfield) asked if the Council had any definite information regarding radio re-diffusion proposals and Mr. Lilwall replied in the negative.

Regarding the paragraph of the report relating to increases in charges, Mr. Lilwall said that they had that day received a letter from the Electricity Commissioners, following upon a recent interview, in which the Commissioners said that it would not be a condition in sanctioning future increases in electricity charges that balances and reserve funds should first be drawn upon, unless they were substantial. Where reserve funds had been seriously depleted it would be permissible to devote part of the increase to their restoration.

Delegates assembling outside Kingsway Hall

Referring to the disbandment of the National Gas and Electricity Committee, a member asked if this meant the end of the "truce" and if the Commissioners were



General view of the meeting

considering the withdrawal of their restrictions on new connections and changing-over from gas to electricity. Mr. Lilwall said that the matter would be discussed with the Commissioners but he reminded the questioner that there was still a shortage of labour and materials. The report was adopted.

Mr. Lilwall hands over the presidential chain to Sir William Walker

Upon the motion of ALDERMAN J. R. POTTS (Carlisle), seconded by MR. E. E. HOADLEY (Maidstone, hon. secretary) the accounts were approved.

MR. W. DAVIES (Tredegar) then moved a resolution requesting the Minister of Fuel and Power "to consider the bringing into operation the special committee which was appointed in 1939 under the chairmanship of Lord Sankey to enquire into the control of gas, water and electricity undertakings by holding companies." The meeting was asked to express the view that "unless the powers and ramifications of holding companies are fully investigated and understood by all sections of the community, any scheme of reorganisation, based on a desire to serve the best interest of the consumer, will inevitably fail."

Mr. Davies dealt at some length with what he termed "this Continental form of organisation" and contended that in a number of directions monopoly had been allowed to proceed in this country unchecked. The provisions of the Electricity Supply Acts were generally fair and they stipulated that undertakings' accounts were to be made public. Holding companies were a device for concealing financial arrangements and taking profit out of the industry. They made it impossible to judge the real capital value of undertakings; they had no statutory powers or responsibilities and were free from statutory control.

The speaker made a lengthy reference to the General Electric Co. which, he said, by owning electricity undertakings secured a ready-made market for its equipment and gave the consumers no choice. He alleged that any competing manufacturer setting up in the area would not be likely to secure very favourable tariffs. Mr. Davies then went on to refer to the Edmundson organisation which, he stated, controlled 25 per cent. of the electricity supply of the country. He alleged that most of the plant at the new South Wales station had been supplied by concerns connected with Edmundsons.

The holding companies by their associations did away with competition in the manufacture of electrical apparatus and any increase in efficiency was negatived by higher

Mr. J. S. Pickles (Dumfries), the new vice-president

financial charges. American experience had shown that holding companies led to inflated capital and instability of management.

The resolution was seconded and after Mr. Lilwall had pointed out that the matter was briefly touched upon in the joint memorandum on reorganisation it was carried unanimously.

With regard to the second resolution, the President ruled that it should be taken in two parts. The mover (COUNCILLOR A. STEPHENSON, South Shields) objected to this, but proceeded to present the first part which called for the rescission of Part III of the Joint Memorandum on the reorganisation of distribution (the "White Memorandum"). He maintained that at the meeting of the Association at which the Memorandum was adopted there was a majority in favour of deleting Part III. The Council had stated that it was bound by the terms of the Harrogate resolution of 1939 but that resolution had been adopted without proper examination. It had also been said that the Joint Memorandum was a logical preface to the I.M.E.A.'s separate memorandum on the subject (the "Brown Memorandum") but this was strange logic. The Brown Memorandum proposed that all undertakings should be transferred to public ownership as soon as possible; the White Memorandum sought to defer or abolish this, although the I.M.E.A. Council argued otherwise. The proposed area committees were a piece of time-wasting machinery. It had been said that some local authorities had failed in their duties but this was by no means true of them all.

South Shields had purchase rights maturing in 1946 but had agreed with the Commissioners to defer action for a year. The areas concerned were built-up areas in which the Council was spending huge sums on development. Was it right that a private company should derive profit from this development while charging higher prices than the Corporation? The Joint Memorandum would allow the companies to retain their rights for a generation; the Corporation would merely have a solitary voice in the area committee, which was to act in an "advisory capacity," after the Corporation had handed over its rights. They believed that Part III had been rejected by the members; nobody could reconcile the I.M.E.A.'s views with the Joint Memorandum.

When the motion had been seconded by MR. R. G. WIDGERY (Dover), MR. F. NEWEY (Lincoln, past-president) said that the decision taken in April last year was in no way challenged but the Association was asked to rescind the operative part of the Memorandum. Careful study of the wording of the two documents would show that they were in no way contradictory. Councillor Stephenson had referred to differences in prices; if South Shields extended its area it would merely push that difference further out. An area committee might recommend that the Corporation should take over a wider area to give more consumers the benefit of

Members of the Council on the platform

cheaper supply. The Brown Memorandum stated that where there was a transfer it should be to municipal ownership; this was not inconsistent and he stood by it. He asked the meeting to vote against the resolution.

ALDERMAN H. T. GILLETT (Oxford) said that the deferment of purchase rights until the area committees were established might be for a long time. Then the committees' recommendations had to be agreed to by the Electricity Commissioners which would lead to further delay. There was a conflict between the two memoranda. The whole of the industry should be transferred to public ownership.

Mr. Lilwall said that the majority of members supported both memoranda. The Minister of Fuel and Power had already received representations from objectors and so he was well aware of the situation. If the I.M.E.A. tried to retrace its steps its views would not be taken seriously in the future.

The motion was put to the meeting and declared lost on a show of hands. A poll was demanded; this resulted in 96 votes in favour of the resolution and 337 against.

Councillor A. Stephenson (South Shields) moving his resolution

Councillor Stephenson then moved the second part of his resolution which proposed the Minister should be informed of the inability of the parties concerned to reach agreement upon the ownership of distribution undertakings and generating stations and the establishment of a national standard bulk supply tariff and that he should be asked to seek the separate views of the various associations and groups on these matters. The Association was also asked to re-affirm its faith in the continuation and extension of public ownership and instructed the Council to conduct the Association's affairs in accordance with this declaration. Councillor Stephenson said that while the more reactionary company elements had left the Joint Committee the others were satisfied to remain so long as the I.M.E.A. handed something over to them. They had made a free gift to the private interests and all that the Association and the public had got out of it was a a proposed limitation of private companies' profits. If the Council stood by the Joint Memorandum it was against all that the Association stood for.

MR. GARFIELD RICHARDS (Port Talbot) seconded the resolution and MR. J. ECCLES (Liverpool) then moved an amendment which substituted for it a declaration that the Minister had been definitely informed by the Association of its views on the subjects mentioned in its separate ("Brown") memorandum and stating that the Association re-affirmed its faith in the continuation and extension of public ownership and control of electricity supply. Mr. Eccles said that the Minister could have no doubt of the views of the Association. Perhaps the memorandum did not go far enough and should have advocated *municipal* ownership.

ALDERMAN G. B. BROOKS (St. Marylebone), seconding the amendment, said that an Association such as theirs could not keep undoing its work from time to time.

The President asked Councillor Stephenson to accept the amendment but he said that he represented his own and other authorities and therefore could not do so. The amendment was put to the meeting and carried and was then approved as a substantive resolution.

Mr. Lilwall formally announced the election of Alderman Sir William Walker as president for the ensuing year and invested him with the chain of office. Sir William Walker expressed his appreciation of the honour and said he hoped that next year they would be able to hold a convention at which they could exchange views and form new friendships. He moved a vote of thanks to Mr. Lilwall for his services during the past year.

The election of MR. J. S. PICKLES (county electrical engineer, Dumfries) as vice-president was announced, as was the election of MR. H. C. LAMB (formerly city electrical engineer, Manchester) as an honorary member.

Overhead-Line Charts—I

Load-Carrying Capacity and Voltage Drop

By J. S. Forrest,
M.A., B.Sc., F.Inst.P.

IN considering the operation of existing overhead lines it is often necessary to calculate the voltage drop in the line due to a given load of known power factor. Further, in the case of projected lines, it is necessary to decide on the line voltage and conductor size which will result in a voltage drop not exceeding a certain value at the anticipated peak load.

Various universal charts have been constructed enabling such problems to be solved for any line. In the experience of the writer, however, the best method in practice is not to employ a universal chart, but to utilise a series of charts, a separate one for each line voltage and conductor size. In the case of "short" lines, the load is inversely proportional to the length of the line, and a further simplification can therefore be effected by working in megawatt-miles. Each chart of the series now contains only five variables, namely, voltage drop, MW-miles, MVAR-miles, MVA-miles, and power factor of load.

Table I gives details of the conductors and electrical constants of the lines considered. Conductors are assumed to be of copper up to and including 22 kV and of steel-cored aluminium for higher voltages.

Principle of the Circle Diagram

The vector diagram for a short transmission line is given in Fig. 1, where e_s is the voltage to neutral at the sending-end, e_r the voltage o neutral at the receiving-end, I the line current in amperes, I the line length in miles, R the line resistance in ohms per mile, X the line inductive reactance in ohms per mile and cos ϕ the power factor of the load.

It follows directly from the vector diagram that the sending-end voltage is given by

$$e_s^2 = (e_r \cos\phi + IRl)^2 + (e_r \sin\phi + IXl)^2 \ldots . (1)$$

Equation (1) is not in convenient form for practical purposes as the transmission line

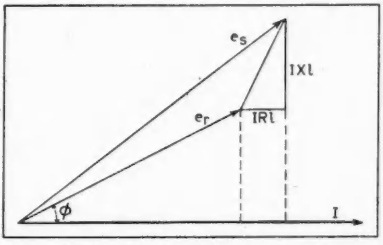


Fig. 1.—Vector diagram of short transmission line

engineer usually thinks in terms of the three-phase power in kW or MW, percentage voltage drop, and line voltage in kV between phases. Equation (1) can be expressed in these terms by substituting: $P = 3e_rI\cos\phi/10^6$ for the three-phase receiving-end power in MW, $Q = 3e_rI \sin\phi/10^6$ for the three-phase receiving-end reactive power in MVAR, and $E_s = \sqrt{3}e_s/1{,}000$ and $E_r = \sqrt{3}e_r/1{,}000$ for the sending-end and receiving-end kilovolts between phases.

TABLE I.—ELECTRICAL CONSTANTS OF OVERHEAD LINES

System kV	Equivalent copper, sq. in.	Stranding	Overall diameter, in.	Resistance at 20 deg. C., ohms per mile	Mean spacing, ft.	Reactance at 50 c/s, ohms per mile	Impedance at 50 c/s, ohms per mile
0·4	0·05	3/·147	0·317	0·88	1	0·48	1·01
	0·10	7/·136	0·408	0·44	1	0·44	0·62
	0·20	7/·193	0·58	0·22	1	0·40	0·46
3·3	0·05	3/·147	0·317	0·88	3	0·59	1·06
6·6	0·10	7/·136	0·408	0·44	3	0·55	0·70
11	0·20	7/·193	0·58	0·22	3	0·51	0·56
& 22							
33	0·075	7/·161	0·48	0·59	9	0·65	0·88
&	0·10	6/·186	0·56	0·44	9	0·63	0·77
66		7/·062					
	0·15	37/·102	0·71	0·29	9	0·60	0·67
	0·175	37/·11	0·77	0·25	9	0·59	0·64
132	0·175	37/·11	0·77	0·25	18	0·67	0·71
220	0·30	37/·146	1·02	0·145	25	0·66	0·68
264	0·40	37/·168	1·18	0·11	30	0·66	0·67

Then equation (1) can be reduced to

$$\left(Pl+\frac{RE_r^2}{Z^2}\right)^2+\left(Ql+\frac{XE_r^2}{Z^2}\right)^2=\frac{E_r^4}{Z^2}\left(\frac{E_s}{E_r}\right)^2 \quad ..(2)$$

If MW-miles and MVAR-miles are taken as X-axis and Y-axis, respectively, and if the receiving-end voltage (E_r) is constant and the sending-end voltage (E_s) variable, then equation (2) is clearly a family of concentric circles. The co-ordinates of the centre of the circles are $-\frac{RE_r^2}{Z^2}$, $-\frac{XE_r^2}{Z^2}$, while the radii are of length $\frac{E_r^2}{Z}\cdot\frac{E_s}{E_r}$, the radius of any particular circle being proportional to the sending-end voltage.

In order to construct the chart, the centre (C in Fig. 2) of the circles is first plotted using the values of receiving-end voltage, resistance,

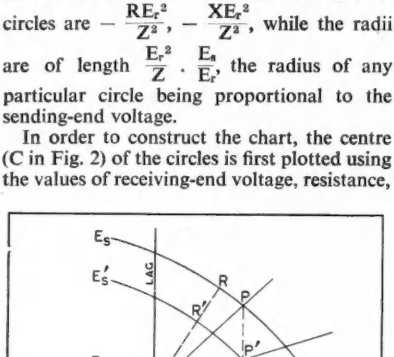


Fig. 2.—Construction of receiving-end power circle diagram (receiving-end voltage constant)

reactance, and impedance for the line in question. Then, with centre C and radius CO the circle OB can be drawn which corresponds to equal sending- and receiving-end voltages. The radius CO is next increased to CR where $\frac{CR}{CO}=\frac{E_s}{E_r}$ and the circle drawn for sending-end voltage E_s. Further circles are then drawn to give the range of sending-end voltages which it is desired to consider. The line operating conditions are specified by the point P, the sending-end voltage being E_s, the MW-miles load OM, and the load power factor angle ϕ. It is convenient to mark the sending-end voltage circles in terms of voltage drop, and the load angle lines in terms of power factor.

Briefly, the chart gives the relationship between five variables (only two being independent): MW-miles (OM), MVAR-miles (MP), sending-end voltage (E_s), power factor angle of load (POM), and MVA-miles (OP). If any two of these variables are given, the remaining three can be read off the chart. In order to find the actual loads, MW-miles and MVAR-miles must, of course, be divided by the line length of miles.

In cases where the voltage drop is excessive, the chart can be used to find the condenser capacity required to reduce the sending-end voltage to any given value. Thus, in Fig. 2 if, for the same load OM, the sending-end voltage is to be reduced to E_s', the new operating point will be P′, and the MVAR-miles condenser capacity to effect this change is PP′; the equivalent power factor of the load will now be cos ϕ'.

Loads of leading power factor are, of course, represented by points on the negative side of the power axis. Thus, considering point Q, for example, it is seen that, for a sending-end voltage E_s, the line capacity will be increased to ON MW-miles if the load has a leading power factor angle NOQ.

It has been assumed in the above discussion that the receiving-end voltage (E_r) is fixed. Similar diagrams can be constructed for a fixed sending-end and variable receiving-end voltages. In practice, however, it is normally required to supply the load at a fixed voltage, and even when this is not the case the assumption that the receiving-end voltage is fixed will suffice for most calculations. Accordingly, all the charts given here are based on a constant receiving-end voltage which is taken to be equal to the system voltage.

The implications of equation (2) and Fig. 2 must now be considered in rather more detail in order to obtain the fullest use of the charts.

Line Voltage

Equation (2) shows that, other things being equal, the load-carrying capacity of a line is proportional to the square of the voltage. Thus, raising the voltage of a line is a very effective way of increasing its capacity, and this suggests that, when designing new lines, consideration should always be given to the use of a form of construction which will be suitable for conversion to higher-voltage operation at a later date. Further, since load capacity is proportional to the square of the voltage a chart prepared for one voltage can be used for a line operating at a different voltage, provided the electrical characteristics are similar. Thus, the load-carrying capacity

of 3·3-kV lines can be obtained by dividing by 4 the figures found from the 6·6 kV charts. Similarly, the 11-kV charts are used for 22-kV lines, and the 33-kV charts for 66-kV lines, the MW-miles found from the charts being multiplied by 4 in both cases.

Conductor Spacing

The spacing given in Table I is the mean spacing $D = \sqrt[3]{D_1 D_2 D_3}$, where D_1, D_2, and D_3 are the distances between the phase conductors.

The spacing, which is largely a function of the span length, varies considerably in practice for lines of the same voltage. Fortunately, however, the reactance does not vary rapidly with variations in spacing. Even doubling or halving the spacing changes the reactance by only ± 10 per cent., and no errors of consequence will result if the spacing is rather different from that of the charts. The charts for 11-kV and lower voltages are based on spacings which would be used with pin insulators, while larger spacings permitting the use of suspension insulator strings have been adopted for voltages of 33-kV and above. The 11-kV charts could, however, be used for 33-kV lines with pin insulators by multiplying the MW-miles by 9 as explained above. An earth wire has little effect on the symmetrical three-phase reactance, and the charts may be used for lines with or without an earth conductor. Further, the effect of another circuit on the same towers may be neglected.

Conductor Material

The use of cadmium-copper in place of copper for 22-kV and lower-voltage lines would not affect the accuracy of the charts appreciably, but for the higher-voltage lines its substitution for steel-cored aluminium would increase the reactance by about 4 per cent., thus reducing slightly the load-carrying capacity.

Power Limits

For specified voltage conditions, there is a theoretical upper limit to the power which the line can deliver (see Fig. 2); this is sometimes called the " static stability limit " of the line.

For equal sending-end and receiving-end voltages, the maximum power is given by AB. This part of the diagram is not usually included in the working chart, but the power limit can be obtained as follows from the radius of the circle and the known co-ordinates of the centre: $Pl_{max} = AB = CB - CA =$

$$\frac{E_r^2}{Z} - \frac{RE_r^2}{Z^2} = \frac{E_r^2}{Z}\left(1 - \frac{R}{Z}\right) \quad \ldots.(3)$$

Thus, the power limit is proportional to the square of the voltage, and varies with the line impedance (Z) as shown in Fig. 3. It is at least of academic interest to note that the power limit has a maximum value when the line impedance is twice the line resistance, and that if the line impedance is less than this value (quite a usual condition), the power limit actually increases as the line impedance

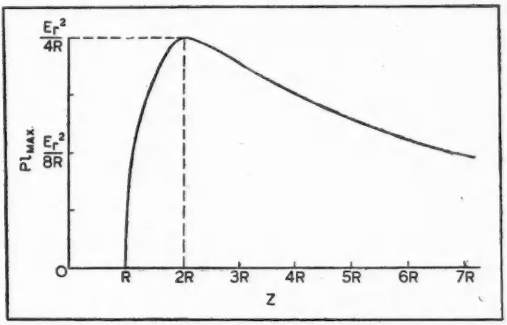


Fig. 3.—Variation of power limit with line impedance

increases. The power limit (Pl_{max}) is not a practical working limit, but it is a very useful guide to the maximum safe working load of a line. In practice, the actual power limit is determined by the system conditions as a whole, including the characteristics of the generators and the clearance time of the protective equipment. The working power limit of a line on a large interconnected system is usually found to be approximately half the theoretical power limit as deduced from the circle diagram.

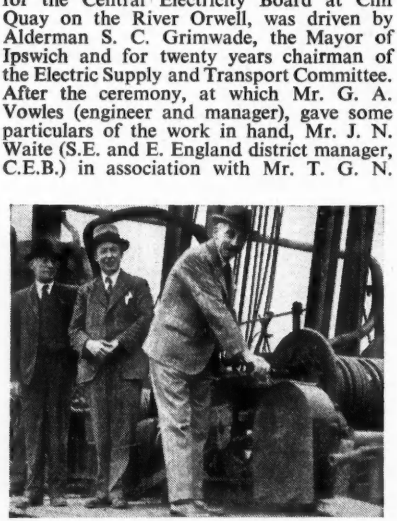
New Zealand Trolley-bus Proposal

AFTER making an extensive survey of the subject Mr. L. B. Hutton, general manager of the Wellington Tramways, has recommended that his department should prosecute inquiries for the introduction of trolley-buses into the Wellington transport system. He advises against further extension of tramway tracks but considers that both tram and bus fleets should be maintained at their present numbers. The City Council has discussed the report in committee but will make no decision until the matter has been given fuller consideration.

New Ipswich Station

Commencement of 270,000-kW Scheme

ON June 11th the first of 6,500 piles to provide foundations for a new power station which Ipswich Corporation is building for the Central Electricity Board at Cliff Quay on the River Orwell, was driven by Alderman S. C. Grimwade, the Mayor of Ipswich and for twenty years chairman of the Electric Supply and Transport Committee. After the ceremony, at which Mr. G. A. Vowles (engineer and manager), gave some particulars of the work in hand, Mr. J. N. Waite (S.E. and E. England district manager, C.E.B.) in association with Mr. T. G. N. Haldane (Messrs. Merz & McLellan) presented the Mayor with a scroll containing the words to be inscribed on the foundation stone.



The Mayor, Alderman S. C. Grimwade, working the winch for driving the first pile, with Mr. J. N. Waite (C.E.B.), centre, and Mr. G. A. Vowles (borough electrical engineer and manager) on left of picture

The station, the capital cost of which is estimated at £8 million, is intended to have a capacity of 270,000 kW by 1950. Four of the six 45,000-kW sets are to be installed in the first stage, the first to be in commission in 1947 with six of the nine 365,000 lb. per hr. pulverised-fuel boilers. The latter will be operated under master automatic control and steam conditions will be 365 lb. per sq. in. and 850 deg. F. Circulating water is to be taken from the Orwell. There will be three 320-ft. chimneys. Switching will be carried out at 132 kV, the alternators being solidly connected to 11/132-kV transformers feeding into two main transmission lines of the grid.

A total area of forty acres is covered by the scheme, of which twenty will be for the site, five for approach roads and fifteen for the reclaimed foreshore, where there is to be a coal unloading quay and storage for 500,000 tons. Two or three 4,000-ton colliers are to be purchased.

The consulting engineers are Messrs. Merz & McLellan, for whom Sir Alexander Gibb & Partners are acting in regard to the civil engineering works. The architects are Messrs. Farmer and Dark. The principal contractors already approved include Edmund Nuttall, Sons & Co (London), Ltd., riverworks, foundations and buildings; Cleveland Bridge & Engineering Co., Ltd., steel-frame buildings; Metropolitan-Vickers Electrical Co., Ltd., turbo-alternators, condensers and auxiliary apparatus; Babcock & Wilcox, Ltd., boilers, pulverised-fuel, mechanical-draught, dust-extraction and ash-handling plant; Drysdale & Co., Ltd., circulating-water pumps; Aiton & Co., Ltd., pipework and pumps; Robert Dempster & Sons, coal handling plant; Stothert & Pitt, Ltd., jetty cranes; and Ransomes & Rapier, Ltd., turbine-house cranes.

Mr. Alexander Rebuked

IN the course of his broadcast election address last week, Mr. A. V. Alexander, First Lord of the Admiralty in the late Government, stated that the electricity supply industry was in a chaotic condition and as an indication of this quoted an example where the price of electricity was 9d. per kWh on one side of the Thames and 1d. on the other.

The matter has been taken up with Mr. Alexander by the Joint Committee of Electricity Supply Organisations, which first sent him a telegram deploring the statement and followed it up with a letter, a copy of which has been sent to us by Mr. H. F. Carpenter, hon. secretary. In this the Committee points out that it is representative of all branches of the electricity supply industry and is entirely non-political. Concern is expressed that a man of Mr. Alexander's national eminence should have made such a statement, but the Committee feels that there must be some foundation for it, although it is apparent that there must have been some misunderstanding in the interpretation of the facts. Mr. Alexander is therefore asked if he will give the Committee further particulars.

The Committee expresses strong disapproval of the allegation that the industry is in a chaotic state, which, it says, does not conform to the view expressed by the Minister of Fuel and Power, who as recently as May 18th addressed to Mr. A. J. Fippard, the chairman of the Committee, a letter in which he conveyed to everyone in the industry his appreciation of the services rendered to the nation during the war. Major Lloyd George said that the industrial production on which our war effort had been based would have been impossible without the electricity industry's part in making a supply available wherever it was needed.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

A Fair Deal for Service Men

BEING a regular reader, I have noticed with great surprise the numerous jobs that have been advertised lately, especially with municipal and company-owned electricity undertakings. Surely those situations should be of a temporary nature so as to give the Service man, who has had to sacrifice five or six years of his career, a chance to apply.

Invariably these jobs are filled by men in the early thirties who have been fortunate enough to have been retained in civil life. Only this week it was stated in the Press that thousands of civilians had rushed for executive engineering jobs on the Continent. Have we, the majority of us qualified, to accept what is left?

SERVICEMAN.

Busbar Chambers

IT is often difficult to ensure that a source of supply is controlled as a whole by a suitable main control although this is very desirable from both the user's and the supplier's points of view. All too often circuits are wired individually to the supply point where the supply authority has to make the best of a bad arrangement and somehow connect it up to the meter. Works that have expanded from small beginnings are the worst offenders.

Specially designed busbar chamber

With the objects of simplification, lower cost and flexibility of means of connection in mind, the busbar chamber illustrated was designed for a particular job. The writer was unable to find a similar one catalogued although it is an arrangement that should find many similar uses. It constitutes an inexpensive means of providing for future extensions whilst complying with I.E.E. Regulation No. 104 which requires "means of disconnecting the busbars from the supply." It is assumed that this "means" will not be used for routine operation, but only when it is required to make the bars dead for some special reason. Normal switching is done on the circuit switches situated immediately above and/or below the chamber.

The compartment in which the cut-outs are housed accommodates ones of 60-A size, as in this case, for straight-through metering, or of 100-A size in which case ring-type current transformers are threaded on the incoming cables from the service fuses, and housed on the left of the cut-outs.

The larger size could replace the smaller if extensions made this necessary, without causing any disturbance of existing circuit connections. The portion in which the c.t.'s are situated has its own cover which can be sealed. A hinged cover over the part containing the cut-outs facilitates access.

Sunderland. P. RIDLER.

Low-Voltage Supplies

THE remarks of Mr. R. Bennett in your issue of June 1st regarding the use of low voltage for portable tools, etc., are interesting and will no doubt be endorsed by the majority of works engineers. At the same time I would go further, and suggest that if it is considered desirable to adopt a low voltage in the factory for portable tools, it is far more important to apply the principle in the domestic sphere.

With the more extensive use of electricity for domestic purposes, houses are becoming miniature power installations, so that safety and security should have first consideration. A factory will usually employ an electrician, whereas the members of the average household are completely ignorant of the elementary principles of electricity.

Has the time arrived to consider the advisability of installing a double-wound transformer for every house (or group of small houses) providing a secondary supply not exceeding 50 V? This could easily become universal, independent of the distribution voltage, thereby overcoming voltage discrepancies which do exist in different parts of some cities and, most important, would eliminate the eternal internal earthing problem which is the cause of most, if not all, accidents.

The present system for domestic uses is a relic of the early DC days when the supply was obtained from small dynamos. The AC supply, and subsequently the powerful grid

scheme, were launched on the early principle (which was mainly lighting) without appreciation of the possible reaction of the human element.

The proposal for a low-voltage supply in houses may be looked upon as revolutionary, but as we are living in revolutionary times, the subject is not considered inappropriate. To carry the matter further, consideration might also be given to supplying 3-phase current to all houses with a maximum for internal use of 50 V between lines on the secondary side of the transformer. This would enable more robust domestic appliances to be employed, and most important of all, earthing would be unnecessary.

Southsea, Hants. D. DYSON RAYNER, M.I.E.E., A.M.I.MECH.E.

Aberdeen's Trams

ON p. 822 of the *Electrical Review* of June 8th I notice "Reflector's" comments on the "Baba" system of power transmission coupled with the comments of an Aberdeen councillor who urges that the Corporation trams should not be renewed, but scrapped. I write because these comments give a reversed view of the situation, and I hope you will see your way to publishing some sort of correction.

In actuality but two Aberdeen councillors advocate tram scrapping and they propose different substitutes. The one you mention was previously a trolley-bus advocate, yet on recently changing his advocacy to the Baba system casually dismissed trolley-buses as having disadvantages not worth enumerating.

The true situation is that the rest of the Aberdeen Council, the Transport Committee, and the transport manager (who is, after all, the authoritative person, being employed by the Corporation as its transport adviser) are wholeheartedly in favour of tramway retention and modernisation. Possibly you did not know that the English Electric Co. delivered two complete new cars of *modern* design to Aberdeen in (I think) 1941.

Irrespective of the incorrect view given of the Aberdeen position I must disagree with the unsupported assertion that "the natural successor to the tramcar is the trolley-bus." Surely the natural successor to the *old* tram is the *new* one? What is there wrong with the tramcar that it should have a "natural successor"? Has "Reflector" been to Liverpool or Blackpool and seen the modern systems and cars there? The "Coronation" cars of Glasgow Corporation are regarded by some as the finest cars in the world.

The lowest suburban fares in Britain are in tramway towns. The lowest accident rates per vehicle-mile are held by trams. The tram is the last of vehicles to be stopped running by severe weather, snow, ice or fog. A tram is compelled to be fitted with a cowcatcher type lifeguard at the front. A tram cannot skid. These points alone make difficult any case for the natural supersession of a tramway. (I admit that very severe gradients, very narrow streets, and very light traffic make the tram unsuitable in some areas, but "Reflector" implies that all trams have the trolley-bus as a natural successor.)

I am a member of the electricity supply industry, not professionally interested in transport, and write with this plea for clear thinking, that old *v.* new should not be confused with railed *v.* steerable.

*London, S.W.*11. B. JOHN PRIGMORE, M.A.

Circuit Diagrams

REGARDING Mr. A. Jones's letter in your June 8th issue, whilst I am all in favour of standardisation when possible there are great difficulties in this case. An arrangement such as he advocates where the contacts operated by a coil are drawn vertically above or below the coil is excellent for comparatively simple diagrams such as for motor starters but is, by way of example, unsuitable for a wiring diagram of an automatic telephone exchange.

A system of standard international symbols is in existence but, in my opinion, is unsuitable for every form of wiring diagram, the symbols being difficult both to understand and to draw. There is a large measure of standardisation in diagrams prepared by the leading telephone companies in this country, but their method, although excellent for their own purposes, is not likely to find general favour, since the diagrams are not easy to read unless one is used to the system employed. Another difficulty is that it is extremely hard to change from a set of symbols to which one is accustomed to a new set.

Apart from methods of drawing, many firms are unwilling to supply complete diagrams, because it is, unfortunately, not unknown for the information given therein to be used by rival companies with a consequent waste of effort of the original designer.

Complete standardisation of diagrams seems unlikely, but there may be some hope of limiting the present multitudinous systems to two, *viz.*, Mr. Jones's and the telephone. In general it is most important that symbols should give a clear impression of what they are intended to represent, at the same time should be easy to draw.

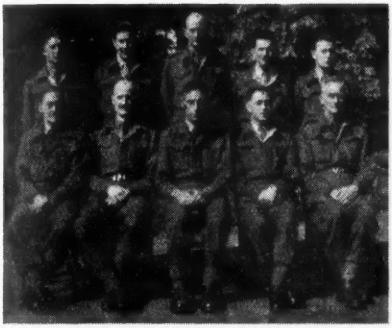
*Chelsea, S.W.*3. W. S. FORSTER BROWN, *Technical Director*, Instanta Electric, Ltd.

Electrical Research in America.—The American General Electric Co. proposes to add 50 per cent. to its research space by the construction of a new laboratory, costing $8,000,000, near Schenectady.

PERSONAL and SOCIAL

News of Men and Women of the Industry

IN our issue of May 25th, we published a photograph showing the headquarters staff of the 163 Co. Royal Engineers (Power), 21st Army Group. We have now received from Major T. G. Martin the accompanying photograph of all the officers belonging to the C.R.E. (Power) unit and a special Electrical and Mechanical Company, R.E. During the eleven months' campaign power duties have been performed in France, Belgium, Holland and Germany, and have embraced Diesel and steam generating plant reinstatement and operation in units varying from 350 to 16,000 kW. All types of systems have been covered, including traction DC and 150-kV supplies, and the installations have comprised a large number of substations and many miles of e.h.v. and h.v. transmission lines. Few engineers can have been concerned with such a variety of equipment in such a short time.



Officers of the B.L.A. Power Formation
Standing (left to right) : Lieut. J. D. Bridgman (East Ham Corporation), company officer ; Capt. E. W. Davies, 2nd in command ; Capt. M. J. Street (Guildford Corporation), company officer ; Major J. W. Hill (County of London Co.) C.R.E. Staff ; Lieut. J. MacPherson, company officer. Seated (left to right) : Major F. E. L. Banister (Callender's), transmission adviser ; Major T. G. Martin (City of London Electric Lighting Co.), O.C. Company ; Lt.-Col. N. R. Elliott (Wimbledon Corporation), C.R.E. ; Major V. Press (Lancashire Dynamo and Crypto), C.R.E., administration officer ; Major L. W. Neville (Metropolitan-Vickers), turbine adviser.

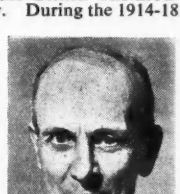
Mr. Arthur M. Parkinson, has relinquished his position with the Central (Technical and Scientific) Register, Ministry of Labour and National Service, and has returned to his former duties at the L.C.C. Hackney Technical Institute.

Mr. A. D. Butchart, B.Sc., has been appointed executive liaison officer to the Manchester Joint Research Council (which is representative of the Manchester University and the Manchester Chamber of Commerce), one of the main objects of which is " the encouragement of activities designed to bring science and industry into closer relationship." His address is: c/o the Manchester Joint Research Council, Manchester Chamber of Commerce, Ship Canal House, King Street, Manchester, 2.

I.M.E.A. Council.—At the annual meeting of the I.M.E.A. reported in this issue the results of the Council elections were reported as follows:—*Group* A.—Councillor F. Walters, Mr. H. Breckell and Mr. O. G. Cook. *Group* B.—Alderman W. E. Sowter, Alderman C. A. Critchley, Mr. F. Newey and Mr. E. E. Hoadley. *Group* C.—Councillor A. Critchley, Mr. J. Eccles and Mr. E. Jones.

Mr. J. E. Pownall, who has been deputy borough electrical engineer of Tunbridge Wells for over thirty years, was recently presented with a box of cigars and a cheque on the occasion of his retirement. The presentation was made by the Mayor. Mr. R. N. Torpy, the borough electrical engineer, mentioned that he had first been associated with Mr. Pownall in the electrical industry at Bolton over forty-seven years ago.

Mr. F. R. Unwin, M.I.E.E., who, as reported last week, has been appointed manager of the Instrument and Switchgear Department at the head office of the General Electric Co., Ltd., has for the past eighteen years been district manager of the G.E.C.'s branches in Ireland. He joined the company in 1919 after serving an apprenticeship with Crompton & Co., Ltd., at Chelmsford, and a period of technical training in electrical engineering at Central Technical College, South Kensington, followed by two years in the heavy engineering test-bays at the British Thomson-Houston Co., Ltd., Rugby. During the 1914-18 war he served with the Royal Engineers (T.F.). After a refresher course at the G.E.C. Engineering Works, Mr. Unwin was attached to the Birmingham sales branch as branch engineer and was in 1923 appointed assistant manager, which position he held until he was appointed manager of the Irish District in 1927. He was chairman of the Irish Centre of the Institution of Electrical Engineers in 1933, and has been vice-president of the Belfast Association of Engineers and chairman of the Libraries and Museum Committee of the Belfast Corporation. In addition to his professional duties Mr. Unwin has taken an active part in the social life in Northern and Southern Ireland, was president of the Belfast Rotary Club in 1938 and was nominated chairman elect of the Irish District in 1945.



Mr. F. R. Unwin

Mr. William L. Russell, B.Sc., a member of the engineering staff of the Corporation of Edinburgh Transport Department, has been appointed deputy general manager and engineer of Stockton-on-Tees Transport Department. Graduating at Edinburgh University with honours in electrical and civil engineering, he

subsequently joined the staff of the Transport Department and obtained various promotions leading up to the executive grade of maintenance engineer which he now holds.

Mr. I. R. Cox, general sales manager of Metropolitan-Vickers Electrical Co., Ltd., who as announced last week has been appointed managing director, went to the company as a college apprentice, and at the termination of his apprenticeship in 1913 he was appointed assistant turbine engineer. He joined the Royal Artillery

Mr. I. R. Cox

Mr. J. F. Perry

in 1914 and served in France, Egypt, Palestine and Salonika, ultimately commanding a brigade, and retiring with the rank of major. He was twice mentioned in dispatches, and was decorated with the D.S.O. and the Croix de Guerre. On returning to the Trafford Park Works in 1919, Mr. Cox worked as turbine engineer until 1927, when he went to Russia as chief mechanical engineer for the company, in charge of turbine work in that territory. He afterwards visited Australia and America on the company's business.

Mr. J. F. Perry has been appointed general manager of the Metropolitan-Vickers Electrical Export Co., Ltd., and relinquishes his position as sales manager, Plant Department. After the last war Mr. Perry rendered valuable service to the French Reconstruction Committee in replanning the devastated collieries in the North of France. He has travelled extensively in Australia, Africa and Europe in connection with M-V mining interests.

Mr. F. J. E. Tearle has been appointed a director of Metropolitan-Vickers Electrical Export Co., Ltd., and retains his appointment as principal representative. Mr. Tearle has seen naval service in the present war as lieutenant, R.N.V.R. and was recalled from the Middle East at the end of 1942 to take charge of certain special contracts being executed.

Mr. C. F. Payton, branch manager at Cowes with the Isle of Wight Electric Light & Power Co., Ltd., has retired after fifty-four years' service with the Edmundsons group, forty-five of which have been spent in the Isle of Wight.

Mr. J. Johnson Smith, M.I.E.E., is relinquishing his position as London manager to Johnson & Phillips, Ltd., upon his appointment to manage the Southern Area sales of the Electric Construction Co., Ltd. Mr. Johnson Smith commenced his engineering career with York Corporation and was later with Sunderland Corporation. He then joined F. & A. Parkinson, Ltd., as manager of their Glasgow office, and subsequently became branch manager at Manchester for Crompton Parkinson, Ltd., transferring to their London office in 1930. He joined Johnson & Phillips in 1933.

For many years he has taken an active interest in the Association of Supervising Electrical Engineers, and was chairman for 1939-1940. He takes up his new appointment on July 2nd at 416/419, Cecil Chambers, 86, Strand, London, W.C.2.

Mr. John Horne, A.M.I.E.E., has been appointed London branch manager for Johnson & Phillips, Ltd., with headquarters at Columbia House, Aldwych, to succeed Mr. J. Johnson Smith. Mr. Horne has been associated with the company's London sales organisation for over twenty years.

Mr. F. J. E. Tearle

Mr. G. T. McGlashan informs us that, having disposed of his controlling interests in Edmiston Brown & Co., Ltd., and the Clarmac Engineering Co., Ltd., Glasgow, he has resigned his position of chairman and managing director of these companies and now has no further connection with them.

Mr. William R. Rawlings, chairman of the Rawlplug Co., Ltd., and director of Automatic Controls, Ltd., the Sun Electrical Co., Ltd., and other companies, will celebrate his diamond wedding on Sunday.

Mr. S. Hunt, A.M.I.E.E., M.B.H.I., meter superintendent of the Central London Electricity, Ltd., is retiring on June 30th next after forty-two years' service.

Major H. G. Rowe, for health reasons, is relinquishing the managership of the turbine sales department of the British Thomson-Houston Co., Ltd., on June 30th, but will continue to serve in a consulting capacity. He will be succeeded by **Mr. C. K. Bird,** assistant manager of the department.

Mr. A. E. Beezer, who has been appointed works manager to the General Cable Manufacturing Co., Ltd., Leatherhead, commenced his career with the Western Electric Company before the last war in which he served throughout with the Royal West Kents in Mesopotamia and Persia. Since then he has been continuously employed in the electric cable industry, first with the Telegraph Construction & Maintenance Co., Ltd., later with Croydon Cables and for the last ten years with his present company.

Mr. A. E. Beezer

Referring to the recent announcement of changes in the management of the group, Cable & Wireless, Ltd., states that **Admiral H. W. Grant** is still chairman and managing director of the Marconi group of companies.

In this issue the Leigh (Lancs) Corporation is advertising for a borough electrical engineer (£895-£1,053 plus bonus). The position has been vacant since **Mr. J. B. Hudson** left in 1943. In that year **Mr. S. C. Harling,** then deputy city electrical engineer of Chester, was selected for the post but was called up for the R.E.M.E.

Mr. W. C. Mountain, who has retired from the position of manager of the Melton Mowbray Electric Light Co., was recently presented with personal gifts by the directors and staff.

Obituary

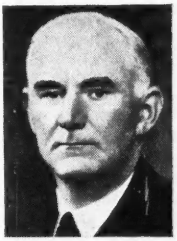
Mr. W. H. Grieve, chairman and managing director of Lightalloys, Ltd., died at Hampstead on June 7th at the age of sixty-five. Mr. Grieve was engaged with C. A. Parsons & Co., Ltd., at Newcastle-on-Tyne, from 1901 to 1904, when he went to Australia as their engineer until 1915, when he returned to this country to take up the position of general manager, Ministry of Munitions National Factory, Dagenham Dock. After some preliminary work with Lightalloys, Ltd., he joined the board in 1924, becoming managing director in 1929 and chairman in 1940. Until recently he was deputy chairman of the Light Metal Founders' Association, and a director of the Manganese Bronze & Brass Co., Ltd.

Mr. Paul J. Myler, director and former chairman of the Canadian Westinghouse Co., died in hospital recently at the age of seventy-six. He was a native of Pittsburgh and had been associated with the company since 1896.

Will.—Mr. J. A. Hirst, founder of Brookhirst Switchgear, Ltd., and a vice-president of B.E.A.M.A., who died last January, left unsettled estate valued at £76,627 (net personalty £68,294).

Birthday Honours

FROM the electrical point of view the principal feature of the King's Birthday Honours list published last week was the knighthood conferred on **Mr. T. A. Eades,** managing director of the Automatic Telephone & Electric Co., Ltd. **Mr. L. E. Mather,** chairman of Mather & Platt, Ltd., and Regional Controller to the Ministry of Production, receives the C.B.E., and the India Office list includes the name of **Mr. J. D. Gulick,** electrical engineer, New Delhi Municipal Committee, who is awarded the O.B.E.



Mr. T. A. Eades

Mr. L. E. Mather

Mr. F. T. Jackson

Sir Eugene Ramsden, Bt., one of the new barons, is a director of British Insulated Cables, Ltd., and of the merger company, British Insulated Callender Cables, Ltd.

Among those to whom the O.B.E. has been awarded are **Mr. H. W. Bowen,** director, Gramophone Co.; **Mr. F. T. Jackson,** chairman and managing director, Telephone Manufacturing Co.; **Mr. A. W. Montgomery,** technical director, Standard Telephones & Cables; **Mr. C. Riley,** telephone sales manager, General Electric Co., Ltd.; and **Mr. T. G. Travis,** engineering sales manager, G.E.C.

The following receive the M.B.E.:—Mr. F. Ashton, Bulpitt & Sons; Miss A. Cook, Belling & Lee; Mr. H. R. Forrest, hon. fuel technologist, Ministry of Fuel and Power; Mr. F. W. J. Gale, S. G. Brown, Ltd.; Mr. B. H. Hemming, A. C. Cossor, Ltd.; Mr. E. M. O'C. Honey, Pritchett & Gold; Mr. H. E. Humphries, Siemens Bros.; Mr. C. P. Johnson, Telegraph Condenser Co.; Mr. S. E. Kirk, Creed & Co.; Mr. C. H. Neal, Newton Bros. (Derby); Mr. H. Nutton, principal, Wimbledon Technical College; Mr. G. W. Preston, Copper Development Association; Mr. A. D. Priestland, Mullard Radio Valve Co.; Mr. H. L. Satchell, B.T.H. Co.; and Mr. R. R. Strand, N.P.L.

The British Empire Medal has been awarded to the following:—Mr. C. R. Appleby, B.T.H. Co.; Mr. G. A. Billings, G.E.C.; Mr. D. K. Braid, Allen West & Co.; Mr. H. G. Calder, Ultra Electric; Mr. H. Cooper, Laurence, Scott & Electromotors; Miss N. L. Cotterell, Murex Welding Processes; Mr. J. Ditchborne, Sunderland Forge & Engineering Co.; Mr. F. A. Fossey, B.T.H. Co.; Mr. D. Foster, Salford Electrical Instruments; Mr. E. Furnell, M.O. Valve Co.; Mr. J. Heslop, Clarke, Chapman & Co.; Mr. W. Heslop, Standard Telephones & Cables; Mr. L. W. Holborn, Hull Electricity Dept.; Mr. E. C. Housley, Marconi Instruments; Mr. F. Jackson, Newman Industries; Mr. J. Jobling, Electrolux; Mr. J. J. Kirkham, Radio Transmission Equipment, Ltd.; Mr. R. McDonald, Babcock & Wilcox; Mr. D. McMillan, Telford, Grier & MacKay; Mr. G. W. Marshall, Fraser & Chalmers; Mr. R. Melton, B.T.H. Co.; Mrs. A. Meredith, B.I. Cables; Mr. W. E. Payton, A. C. Cossor; Mr. E. B. Powell, English Electric Co.; Mr. W. Price, Aeronautical & General Instruments; Miss V. E. Robbins, John I. Thornycroft; Mr. T. Robinson, Metro-Vick; Mr. J. Scotland, Campbell & Isherwood; Mr. J. Thomson, Scottish Cables; Miss R. Thornton, G.E.C.; and Miss F. A. Wheeler, Automatic Telephone & Electric Co.

Mr. F. Riley, Controller, Telegraphs, G.P.O., is made a Companion of the Imperial Service Order.

Views on the News

Reflections on Current Topics

SUPPORT for the view that the next British Industries Fair should be held in 1947 comes from B.E.A.M.A. It is thought that if a Fair were to be held next year there would be great difficulty in arranging adequate accommodation, entertainment and travelling facilities for the buyers who may be expected from overseas. The Association favours a new venue for the "ex-London" portion of the Fair—much nearer London than Birmingham—and at least the domestic appliances exhibition should be held in London. The matter seems to have been settled by an announcement in Parliament that plans are proceeding for a 1947 Fair.

* * *

Mr. S. E. Britton, engineer and manager of the Chester undertaking, refers to my note on the subject of substations in building schemes which appeared in the *Electrical Review* of June 8th. He says that the Chester City Council has approved resolutions of the Housing and Electricity Committees to provide a site on all new housing estates for a substation and residence to be occupied by an employee of the Electricity Department. Under this arrangement there will always be available a suitable person to deal with emergency needs of consumers.

* * *

Last year the Dumfries Town Council disposed of a 1,500-kW turbo-alternator to the East African Power & Lighting Co., Ltd. I now learn that the plant has been re-erected at the company's Ruiru power station where it is giving every satisfaction, and a photograph of the set in its new environment has been sent by the resident engineer to Mr. A. E. Roots, burgh electrical engineer of Dumfries. The plant was dismantled and packed by Balfour, Beattie & Co., Ltd., agents for the East African Company.

* * *

Despite the Board of Trade promise some months ago of facilities for manufacturers to recommence the production of domestic electrical appliances I gather that it is unlikely that large quantities will be on the market for some time yet, unless conditions are changed radically. The raw material situation is comparatively satisfactory but there is still a great shortage of labour, of the right kind, especially in the Midlands. Also, although many war contracts have been cancelled, new ones for equipment for the Far East are absorbing a large proportion of available production capacity. Furthermore, quota arrangements under the Limitation of Supplies Orders make it impossible for manufacturers to plan on mass production lines. The quota period is too short for the smooth running of manufacturing and marketing arrangements, which usually need to be planned as much as a year or more ahead. The existing quotas are generally too small to be economic, which adds enormously to production costs. The resulting retail price, thus inflated, is made still higher by purchase tax.

* * *

The first printed report of a municipal undertaking for the year ended March 31st last which I have seen comes from Mr. A. C. Thirtle who last autumn took over the management of the Carlisle undertaking on the retirement of Mr. C. W. Salt. In his report Mr. Thirtle pays a tribute to the orderly and comprehensive records left by his predecessor which have facilitated his task of assimilating the details of the undertaking. The year has been a busy one at Carlisle, where the second extension of the Willow Holme station was brought into operation during the last quarter.

* * *

I should be interested to know which are the districts mentioned by Mr. A. V. Alexander, First Lord of the Admiralty in the late National Government, in his election broadcast the other night where electricity costs 9d. a unit on one side of the Thames and 1d. on the other. There are, of course, a number of areas where adjustments are very desirable to secure that consumers served by adjoining undertakings should receive more equitable treatment, but the difference quoted does seem rather extreme. The uniform tariff all over the country advocated by Mr. Alexander would no doubt be very acceptable—to the inhabitants of rural areas—but how would urban consumers relish having their charges raised to make it possible?

* * *

I like the picturesque language with which the American journal *Wholesaler's Salesman* describes probable domestic applications for the infra-red-ray quick-drying processes found so successful in industry. "Women," it says, "will use it to dry their nail polish and their hair. The family pooch can be dehydrated by infra-red after the bath, and when evenings are chilly you can sit cozily in your favorite chair with a radiant lamp beamed on neck and shoulders." It seems a pity to spoil this blissful picture but there is the family washing that might be included as well.—**REFLECTOR.**

Electric Vehicles in France

Hiring-out for Transport Service

By T. C. Elliott

THE employment of battery-propelled vehicles in France increased by as much as 600 per cent. during the war years, up to December, 1943, notwithstanding attempted total prohibition of their manufacture by the Germans early in 1942. The number of companies formed for hiring-out electric vehicles, with satisfactory results, has proved to be most beneficial. Such activities would not be increasing unless they were profitable. They have no active counterpart in England, unless one includes Hovis, Ltd., the flour millers, who hire out small vans to their bakery retailers.

The proposal to offer transport to local tradespeople instead of asking them to buy vehicles originated in Lyons in 1927. The company then formed, with a capital of 2 million francs under the title La Société Lyonnaise pour l'Exploitation de Véhicules Electriques, started with a few vehicles and one garage to hold thirty-six. Two years later its capital was increased to 5½ million francs and a second garage was added to provide for a total of sixty-six vehicles. In 1939 the company had three depots, or garages, and over a hundred electric lorries. In May, 1944, the fleet comprised 411 vehicles spread over fourteen depots in Lyons and other towns, the capital having increased to 16½ million francs.

In sixteen years the fleet has covered over 12 million miles in the aggregate and Monsieur Maurice Bouchon (director, Société pour le Développement des Véhicules Electriques) has pointed out that the organisation is not a philanthropic body, but a commercial undertaking whose success is demonstrated by the dividends which are distributed each year.

The possessor of a small fleet in use for his own business purposes does not usually give the same close attention to recording running costs as a transport company whose object is to make a return on its capital outlay.

The motor journal *L'Auto*, in its issue of February, 1942, published the names of seven similar companies mainly concerned with the hiring-out of electric transport and possessing a total of about 1,200 vehicles at that time. The vehicles vary in size from one ton pay-load to six tons, a large number being of the 50-cwt. class. The statistics of these specialist transport firms can be of significance to anyone contemplating similar undertakings in this or any other country. Monsieur Bouchon was given the opportunity to examine their returns and has published some of the figures as set out in the accompanying tables. He emphasises the value of the statistics by the fact that they are based on the performance of 1,200 battery vehicles travelling from 8 to 12 million miles per annum.

TABLE I.—ENERGY CONSUMPTION (AC) WHEN CHARGING VEHICLE BATTERIES

Pay-Load Tons	kWh per km.	kWh per mile
1	0·45 to 1	0·72 to 1·62
2·5	1 to 1·4	1·62 to 2·25
6	1·45 to 2·25	2·33 to 3·62

Variations in consumption depend upon gradients, if any, condition of the road surfaces, the state of the battery and the kind of service or trade that the vehicle is operating in. It should be noted that the energy quantities include the amounts absorbed in the rectifier, motor-generator, or whatever the charging plant may be. When measurements were taken of the actual discharge in watts from the battery by means of a meter fixed on the vehicle the over-all efficiency obtained was 33 per cent., a much lower figure than that usually attributed to the battery, 75 per cent. Nevertheless the cost of this form of fuel for transport purposes in terms of kWh per day or per week is relatively very small.

Table II gives a comparison of the price of energy between 1939 and 1944.

TABLE II.—PRICE PER KWH FROM MAINS (NIGHT TARIFF)

Locality	1939		1944	
	francs	pence	francs	pence
Paris	0·257	0·31	0·422	0·51
Paris (Suburbs)	0·391	0·47	0·544	0·65
Lyons.. ..	0·194	0·23	0·354	0·425

The proximity of Lyons to hydraulic power stations accounts for the lower rate there. The conversion of the price to pence per kWh is calculated at 200 fr. to the £. The average price to-day is approximately ½d. per kWh, a lower price than in many places in Great Britain for the same service.

Further interesting statistics show that in

lost time—the vehicle being out of action for reasons of accident or for periodical overhaul after about 40,000 miles—the "electric" compares very favourably with other vehicles. As an example one vehicle during 21,200 working days was out of service for only 627 days, that is, 2·95 per cent. As to renewal of charging plant, no figures can be given because replacements have not been found necessary; in the depreciation account they are allowed a 20-year life.

Battery Life

The duration of the battery is the most important factor in costing and before the war good results were being obtained from the heavy type lead-acid battery, the normal guarantee period of three years being exceeded sometimes by one or two years. Likewise the nominal six-year guarantee of the alkaline battery has been known to reach 10–12 years. Their calculations of *all-in* costs made the electric vehicle 10–15 per cent. more economical than the petrol commercial van for local deliveries in normal times. The sizes from 4 to 6 tons load had an advantage of 15 to 20 per cent.

Regarding the life of the electric vehicle, Monsieur Bouchon gives details of 31 still in use whose average age is 15 years. Charging plant appears to have an indefinite life and is put down nominally at 20 years.

During the war the replacement batteries often had a much shorter life than the guarantee because they had to be built up largely out of scrap batteries; in fact the guarantee was cancelled. The Germans insisted that a new or replacement battery could not be supplied unless two old ones were handed in for scrap.

In 1914–1918 we had similar difficulties—short supply of raw lead—and hundreds of stationary batteries repaired during that period were cut down to 50 per cent. capacity by law. There were practically no battery vehicles in those days, excepting Harrod's fine fleet of 80, all American, including the batteries (Edison), and two or three locos and trucks, some Kruger broughams at Park Lane and a few Hove—Brighton buses.

Facsimile Colour Telegraphy

PATENTS have been granted in the United States to Finch Telecommunications, Inc., for the transmission of colour by radio or over a wire, the picture being received in the form of three-colour separation films. Other patent holders are the Radio Corporation of America and John V. L. Hogan, while the oldest of the patents are those of the late Captain Otho Fulton, which are now owned in part by the International Business Machines Co. and the estate of the late Captain Fulton. Some Finch, R.C.A. and Hogan receivers are in use and experimental work continues, but progress in facsimile has been delayed by refusal of the Federal Communications Commission in the U.S. to allocate regular wave-lengths to this method of communication because of the differences between the different systems. The F.C.C. insists that, like radio receivers, facsimile receivers must be standardised to the extent that any one can record any facsimile transmission.

The latest Finch patents have interesting implications. Apart from any potential use in transmitting colour photographs, or drawings, over long distances for reproduction, this facsimile method can be used to make the colour separations needed in letterpress printing. The method is not only speedy, but extremely low in cost and, if certain opposition to it is overcome, it may enable newspapers to make substantial use of full colour illustrations. In the standard black and white receivers an electrically heated stylus travels from left to right over specially prepared paper, oxidising the surface or skipping without darkening to form characters.

Only minor changes are required to send colour pictures. The technique of transmission is basically the same, with a colour disc interposed between the scanning eye and the picture on the drum of the transmitter. This filter contains triangular gelatine sections of the three primary colours so that each in turn is transmitted to be recorded by exposure of the film on the receiver drum.

The transmitting cylinder revolves at 300 RPM while the colour disc through which the scanner "sees" the picture revolves but once in the same time. The receiving drum revolves at only 100 RPM and has three times the circumference of the transmitting drum, so that it takes all three films, which record the three principal colours. When the transmitter has sent a complete line from top to bottom of a picture the receiving drum has moved only one-third of a revolution, covering a single line on one colour film. In this way, the scanner selects and transmits impulses for the different colours, the receiving "electric eye" opening and closing to expose the films in the proper places for each of the primary red, yellow and green colours. It is necessary to know in advance or transmit an identification mark indicating the order in which the colours are being scanned.

The films recorded on the receiver are positives on thin translucent or transparent gelatine. After the film is developed it is bleached in the conventional manner and the separations are dyed to their proper colour with aniline or by toning with metallic salt solutions that combine with the silver retained in the print. The monochrome coloured prints are superimposed to form an integral final picture, laminated on paper or board back as in the case of any coloured photographic print.

COMMERCE and INDUSTRY

Industrial and Trade Censuses. Forty-Hour Week.

Production and Distribution

THE President of the Board of Trade announced last week the appointment of a committee to consider and report what additional information should be collected at future Censuses of Production and to recommend what amendments should be made in the Census of Production Act. He said that, as stated in the White Paper on Employment Policy, it is intended to take a Census of Production annually after the end of the war. The information obtained from the Census would form an important part of the body of statistical data required to carry out the policy outlined in the White Paper, and for this purpose it would need to include a wider range of subjects than those covered by the existing Act. The chairman of the Committee is Sir George H. Nelson (English Electric Co.).

A preliminary inquiry made by the Board of Trade last year among leading trade organisations showed that a substantial body of opinion was in favour of the principle of a census of distribution. The President of the Board of Trade has announced that a committee has been appointed to give further consideration to the question. The committee, which will begin its work at once, represents a variety of interests. The chairman is Sir Richard V. N. Hopkins, and the terms of reference are " to consider whether, having regard to the importance of information being made available regarding the wholesale and retail distribution of goods, a regular Census of Distribution should be instituted and, if so, to advise on the field to be covered and generally as to the measures which should be taken in connection therewith."

Engineering Industry Working Hours

Following upon proposals for a radical change in the wage structure of the engineering industry (see our last issue, p. 871), the National Committee of the Amalgamated Engineering Union last week passed a resolution calling for a speeding-up of the negotiations for the institution of a 40-hour week without reduction of pay. It was considered that this would help to maintain the Union's members in employment during the transition period. The opinion was also expressed that the reduction of hours would enable the worker to concentrate better upon his machine and give him an incentive which would lead to better production. The executive of the Union was also instructed to approach the employers for an agreement on two weeks' annual holiday with pay and the granting of ten days specified Bank and local holidays with pay.

Non-Ferrous Metals Consumption

Wartime consumption of copper, zinc, lead, tin, nickel, cadmium, antimony, cobalt and manganese is shown in some statistics received from the Non-Ferrous Metals Control of the Ministry of Supply. As regards copper, the total consumption of virgin metal from 1940 to March, 1945, inclusive is put at 2,254,000 tons. Added to this was copper scrap to the extent of 1,004,000 tons in the period from 1942 to March, 1945. (The figures for the two preceding years are not available.) Most metal was used by the electrical industry; the gross output of high-conductivity rods and strip from 1942 to March last is given as 501,756 long tons and that of rods and sections as 17,406 tons. The total gross output of unalloyed copper products in this period was 777,202 tons. Brass and other copper alloy products and copper sulphate accounted for a further 1,596,250 tons.

In the same period the total consumption of lead was 955,166 tons (including 261,749 tons of scrap). Of this the cable-making industry absorbed 335,158 tons and battery makers 90,628 tons (excluding oxides).

Pirelli-General and "Hais" Cables

The Pirelli-General Cable Co., Ltd., informs us that it produced about fifty miles of the 3-in. lead pipe for the " Hais " oil pipe lines, employing Pirelli-General continuous extrusion machines. Of this about 20,000 yd. were covered and armoured in the company's own works, to form the completed " Hais " cable, and the remainder was transported to other cable factories to be similarly treated. In addition, approximately another hundred miles of lead pipe were produced on the P.G. extrusion machines possessed by Johnson & Phillips, Ltd., Standard Telephones & Cables, Ltd., and the Edison Swan Electric Co., Ltd.

Radio Batteries

Mr. Lyttelton stated in the House of Commons last week that the end of the war in Europe should bring an improvement in supplies of civilian wireless batteries, production of which had, until now, been restricted by urgent Service demands. If he could have details of particular areas in which batteries for blind people were needed, he would see what could be done to help.

Electricity in Houses and Farms

In connection with the " Electricity Looks Forward " Exhibition now being held at Manchester, there has been a series of afternoon talks by specialists to selected types of audiences on the uses of electricity in various spheres. On Wednesday last week, Mr. G. Noel Hill, Manchester city architect, addressed a gathering of architects, builders and electrical contractors on " Planning for Building." Mr. O. Howarth, technical engineer of the Lancashire Electric Power Co., Ltd., who presided, said that to have equipped a house with lighting, wiring, ample plugs, an electric heater in the water cylinder, electric cooker, wash-boiler and radiators in 1939 would have cost about £56. To add a washing machine, refrigerator and drying cupboard would cost another £44. This must not be regarded as an additional cost because the house was electrified and the lighting would be installed in any event. If there were

no radiators and plug points, there would have to be fireplaces as an alternative, so that additional cost for the conveniences which would be demanded by the public in the future, would not by any means be the £56 mentioned. Post-war prices would depend to some extent upon the standardisation of components and there was a move in this direction in the electrical industry. Arrangements had already been made for the components of electric cookers to be interchangeable, and developments in production technique should also reduce costs. Purchase tax was a very important item at the moment and an addition of 27½ per cent. to the price of cookers involved a considerable increase in the cost.

To an audience of farmers, etc., Mr. C. A. Cameron Brown, rural development superintendent, Edmundsons Electricity Corporation, Ltd., said it was in the dairy that electricity had made the greatest contribution and the sterilising chest had provided the greatest single contribution towards a rapid upgrading of dairy hygiene in wartime. Concerning the application of electricity to market gardening, he considered that large-scale soil sterilising by electricity was looming nearer as a possibility and if this became practicable it would revolutionise the *in situ* methods.

Post-War Houses Exhibition

The Electrical Development Association is taking part in a Post-War Homes Exhibition which opened at Dorland Hall, Regent Street, London, this week. The object of the exhibition is to present to the public a wide survey of some of the up-to-date methods employed in the construction, equipping and furnishing of a home. There are twelve full-scale fully furnished rooms, three by E.D.A.—a kitchen, home laundry, and dining and living room.

Visit to Aberdare Cables

Sir George Usher, chairman of Aberdare Cables, Ltd., held out prospects of a rosy future for South Wales workers when he visited the Aberdare factory recently. He spoke of the establishment of two more factories under the same regime which would provide peacetime employment for many more people. South Wales Switchgear, Ltd., Treforest (an associate company), was employing as many people as Aberdare Cables, Ltd., he said, and another factory that had been taken over would also employ hundreds.

Sir George was welcoming the chairmen and engineers of the electrical undertakings in South Wales who were conducted round the Aberdare factory. During the course of his talk, he said that it was their intention to expand the cable works and to bring out new engineering developments.

Domestic Users' Panel

Mr. Duncan Sandys, Minister of Works, has, as he announced in the House of Commons last week, appointed a Domestic Users' Panel to advise him on matters relating to fitments, components and other internal arrangements in small houses from the standpoint of domestic convenience. The chairman of the new Panel, which will sit in London, is the Dowager Lady Reading, J.P.

Electrical Legislation

Supplement No. IX to the "Summary of the Emergency Statutes, Regulations and Orders Affecting the Electricity Supply Industry" is now available from the offices of the Incorporated Municipal Electrical Association, Wellington House, Strand, W.C.2 (price 4s.). This covers all the new regulations, etc., which have appeared between the publication of the last supplement and May 31st last and there is an addendum which gives matter received too late for inclusion in the main body of the supplement. The joint editors of the Summary are Mr. Leslie Gordon (London J.E.A.) and Mr. J. W. Simpson (I.M.E.A.).

Quality Control Course

A course of elementary instruction in quality control methods is to be given in London from July 16th to 20th. The course will consist of lectures, practical work and a demonstration at a factory; it is intended for designers, draughtsmen, engineers and inspectors who are likely to make use of the methods in their work and will be suited to those with mathematics to at least National Certificate standard. Those who complete it should then be able to install quality control in their own factories, and will have the foundations of a knowledge of statistical

Sir George Usher with chairmen and engineers of South Wales electricity undertakings at the Aberdare Cables factory

technique necessary in sound development work. The methods are applicable to a wide variety of production processes. Details can be obtained from the Ministry of Supply, Advisory Service on Quality Control, Berkeley Court, N.W.1.

Speculum Plating

Speculum, an alloy of tin and copper used for telescopes and other optical instruments, is likely to find an extensive new application for plating purposes. Similar in appearance to silver, speculum is less blue than chromium and less yellow than nickel. It can be plated on to practically any metal, including iron and steel, and has already been used for plating electric lamps and fittings, etc. Tested against silver for resistance to tarnishing and corrosion, it remained bright and polished after thirty days of exposure in a normal kitchen, whereas silver lost 80 per cent. of its original brightness. Speculum also resists the tarnishing action of eggs, and lemon and other fruit juices. Although not yet available in any quantity, speculum plating will go into production on a large scale as soon as labour and materials are available.

Electricity for Farming

Mr. W. D. D. Fenton, commercial engineer of the North of Scotland Hydro-Electric Board, addressed the Ayrshire Branch of the Electrical Association for Women on June 7th. Agriculture was the basic industry of the north, he said, and with cheap supplies of electric power they would hope for more intensive cultivation. For example, a vegetable canning industry could be considered and further development of cheese and butter making. More factories for the tinning of milk would be valuable. Demonstrations should be arranged to show how to use electricity efficiently.

Location of Industry Order

The Board of Trade has revoked the Location of Industry (Restriction) Order, 1942, and replaced it by the Location of Industry (Restriction) Order, 1945 (S.R. & O. 1945 No. 672, Stationery Office, 1d.), which came into force on June 14th. Under the new Order the control on the use of factories and warehouses is relaxed. It no longer applies to premises with an aggregate floor space of less than 3,000 sq. ft., or to garages or motor vehicles or cycle repair shops of any size. Licences are also not required in respect of the use of factories or warehouses which have been let or sold to the user by a Government Department. This relaxation does not dispense with any obligation there may be to obtain licences under other Government controls. Apart from these exemptions, the control remains unaltered, and applications for licences should be addressed to the Board of Trade Regional Controller in which the premises are situated. Licences issued under the previous Order remain valid.

Cobalt Control Removed

The Control of Non-Ferrous Metals (No. 19) (Cobalt) (Revocation) Order, 1945 (S.R. & O. 1945 No. 697) revokes the Control of Non-Ferrous Metals (No. 10) (Cobalt) Order, 1942, under which the disposal and acquisition of cobalt-bearing ores, concentrates and mattes, residues from which cobalt can be recovered, cobalt metal, oxides and certain cobalt salts are subject to licence. Licences will no longer be required for the disposal or acquisition of these commodities. Inquiries should be addressed to the Joint Controllers, Non-Ferrous Metals Control, Euston House, Eversholt Street, London, N.W.1.

Cadmium Control Exemptions

The Control of Non-Ferrous Metals (No. 18) (Cadmium) Order, 1945 (S.R. & O. 1945 No. 643) varies the Control of Non-Ferrous Metals (No. 6) (Cadmium) Order, 1941, by exempting from the operation of the maximum price provisions cadmium (virgin or secondary) in the form of ingots, sticks or rods, which is delivered or intended to be delivered outside the United Kingdom or on board ship for export from the United Kingdom. Inquiries should be addressed to the Joint Controllers, Non-Ferrous Metals Control, Grand Hotel, Rugby.

Warning Consumers of Electricity Cuts

The Huddersfield Town Council has approved a recommendation of the borough electrical engineer that the " Ripplay " system used by the wardens' service during the war should be utilised to give warning to industrial consumers should it be found necessary for economy reasons to curtail electricity supplies.

Two Cable Ships Lost

The delegates to the annual conference of the Post Office Engineering Union at Morecambe on Monday stood in silent tribute to 638 members of the grades covered by the Union who gave their lives in the war. Mr. Ernest Power, chairman of the Union, told the delegates that when the Post Office cable ship *Alert* went down shortly before the end of the European war, a whole branch of the Union was lost. The only members of the crew who escaped were a member of the Union and two officers who were on shore leave. Two of those surviving were among the three who were killed shortly afterwards when the *Monarch*, another P.O. cable ship, was lost.

Turkey's Expansion Programme

An increase of 1,190,000 kW in generating capacity is one of Turkey's plans for the expansion of its electrical power system. There is reported to be a preference for complete contracts for supply, erection and construction rather than for equipment supply tenders.—*Reuter's Trade Service.*

Boys in the Contracting Industry

In the note under this heading in the *Electricnl Review* of May 25th the reference to Category IV should read Category III.

Visit to Meter Laboratories

Members of the London Meter Group of the E.P.E.A. recently visited the meter and testing laboratories of the Northmet Power Co. Dividing the large party into groups, Mr. G. F. Shotter and his assistants proceeded with them round the various departments, demonstrating the working of the comprehensive equipment. Later Mr. Shotter illustrated various technical points by

means of scale models and lantern slides. On behalf of the Group, Mr. Davis (Hampstead Borough Council) thanked Mr. Shotter and his colleagues for their hospitality, and paid a tribute to them for their hard work, which had made the visit so enjoyable and instructive.

Certificates in Applied Physics

The announcement by the Ministry of Education of a scheme for the award of Ordinary and Higher National Certificates in Applied Physics brings to fruition one of the recommendations made in the report of the Institute of Physics on education and training issued in 1943. Prospective students may obtain further particulars of the courses from their local technical colleges or director of education. The courses are designed not only to lead to a well recognised qualification in the National Certificate, but at the same time to be of particular benefit to the student by the additional knowledge he will gain. Moreover, the course for the Ordinary National Certificate is intended to lead on to that for the Higher National Certificate, the award of which will be recognised as a definite stage towards the associateship of the Institute (A.Inst.P.).

War Service Certificates

Last week the management of Duratube & Wire, Ltd., presented each of its employees with a certificate signed by the managing director and the general manager expressing the company's appreciation of the work which has been done during the war.

X-ray Engineers

The Institute of X-ray Engineers has been founded for the purpose of establishing the status of individuals employed in the X-ray and allied industries. Its objects include the establishment of an employment bureau; arranging with technical colleges for educational courses; visits to industrial and hospital installations, works, laboratories, etc.; and meetings for the purpose of reading technical papers. The hon. secretary is Mr. J. E. Hood, 32, Broomfield, Adel, Leeds, 6.

Fatality

Broken Cable.—At an inquest on Hugh Ferry (24), an employee of George Wimpey & Co., Ltd., who received a fatal shock while operating an electric drill at Grange Farm opencast coal site, Brinsley, the coroner expressed the hope that steps would be taken to improve the workshop, which he suggested was a very primitive one. An electrical fitter stated that he had only been in charge of the plant a week and did not know until the accident that there was a break in the cable. It had been fastened with insulating tape and the joint, which was a bad one, was lying in water.

Import Duties Restored

Under the Import Duties (Exemptions) (No. 3) Order, and the Additional Import Duties (No. 2) Order, machinery and parts thereof and accessories to machinery or to parts of machinery which have been the subject of a wartime exemption from duty under the Import Duties Act will be liable to duty as from July 1st. It will, however, be open to any importer to apply for a licence to import a consignment without payment of duty on the ground that similar machinery is not, for the time being, procurable in the United Kingdom. Applications should be addressed to the Board of Trade, Import Licensing Department, 1-6 Tavistock Square, London, W.C.1.

A duty-free licence cannot be granted unless application has been made and received in the Board of Trade before the goods in respect of which the application is made reach this country. They are, therefore, advised to make application without delay in respect of any such consignments of machinery which are in transit to this country, otherwise they will be chargeable with duty unless they reach this country and are entered with the Customs before July 1st.

Silver Jubilee Celebration

The outing to Southport arranged for June 20th by Hirst, Ibbetson & Taylor, Ltd., Manchester, to celebrate victory in Europe and their silver jubilee, has had to be postponed until the 28th.

Annual Holidays

Siemens-Schuckert (Great Britain), Ltd., inform us that both their Brentford offices and works and their Park Royal works will be closed for the annual summer holidays for the week July 23rd to 28th. A skeleton staff will be in attendance to deal with urgent correspondence, but the stores department will not be open.

Trade Announcements

Clipper Connectors, Ltd., have moved to Lacey Green, Aylesbury, Bucks. (telephone: Princes Risborough 5).

E. H. Jones (Machine Tools), Ltd., have been appointed sole selling agents for this country for the range of Carter & Wright precision dual keyseating machines.

S. D. Sullam, Ltd., are moving on July 1st to new offices at 100, Wardour Street, London, W.1.

TRADE MARKS

THE following applications have been made for trade marks. Objections may be entered within a month from June 13th.

EASCO CALLBOY (design). No. B633,363, Class 9. Telephonic apparatus. Also EASCOLYTE. No. 630,423, Class 11. Portable electric lamps.—Eric Lewis Eastell and Margery May Eastell, trading as Easco Electrical, 6 and 8, Brighton Terrace, London, S.W.9.

HESCOLUX. No. 633,992, Class 9. Electric flat irons and vacuum cleaners. HESCO and HESCOLUX. Nos. 633,991 and 633,993 respectively. Class 11. Refrigerators, hair drying appliances and electric fires.—Hornby Electrical Supplies Co., Ltd., 21–25, St. Anne's Court, London, W.1.

MINISCOPE. No. 634,022, Class 9. Electrical apparatus and instruments not included in other classes.—General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.

ADDOLITE. No. B631,565, Class 11. Lighting apparatus for indoor photography and parts thereof not included in other classes.—Henry Jacobs, trading as Henry Jacobs & Co., 70, Charlotte Street, London, W.1.

Occupied Jersey

How the Island Fared Under the Germans

By F. M. Burrell, *M.I.E.E., M.I.Mech.E.,*
Engineer & Manager, Jersey Electricity Co., Ltd.

AT the time of the evacuation of Jersey in June, 1940, the Bailiff informed me that the British Government had stressed the importance of maintaining the public services, and I agreed to stay and endeavour to maintain sufficient staff to carry on a normal supply of electricity. Most of our staff of military age went to England to join up, but a sufficient number remained on to enable us to continue operations during the occupation period, until the fuel supplies gave out.

The States placed the control of their Telephone Department, also the gas, waterworks and electricity companies, in the hands of the Department of Essential Services. This Department was composed of three members of the States, with the gas and waterworks company's engineers and myself acting as technical advisers, an arrangement which worked very smoothly, as we all had one object in view and one object only, namely to act as a buffer between the Germans and the civil population.

When the Germans arrived they issued a proclamation, solemnly guaranteeing the life, liberty, and property, of every inhabitant of the Island, but this soon became just another scrap of paper. They brought an electricity rationing scheme with them which allowed each household three lights and one fire, but all other apparatus was to be removed. However, we managed to squash this, and got them to agree to each consumer's electricity consumption being reduced to 66 per cent. of his pre-war figure. This scheme remained in force until March, 1943, but many of our consumers had exceeded their rations, and the Germans were beginning to examine the meter cards, so we changed the scheme and carried out the domestic rationing on a household group basis, thereby giving our people a clean sheet. The new basic ration for lighting and ironing was 3½ units per household per week during the summer months, and 5 units a week for the winter months, but the Department of Essential Services was allowed to grant licences for the use of domestic appliances, and the additional current involved, on receipt of doctors' certificates, and this enabled us to avoid a great deal of hardship where consumers had illness in the house. Except in cases of very severe illness, all these licences were cancelled at the beginning of September, 1944, when electric cooking was also ordered to cease, at the same time as the gas supply terminated.

The rationing of business premises and industrial concerns remained all through on the original basis, *i.e.*, 66 per cent. of pre-war consumption, but special licences had to be obtained before any apparatus could be used. Needless to say, some of our consumers exceeded their ration, and as supplies of fuel became more and more difficult to obtain, and the situation became more acute, we cut the worst offenders off for two or three days, or two or three weeks, in proportion to the offence.

During the last twelve months the Germans reduced the domestic ration in stages, until in January, 1945, they finally brought it down to 1 unit per household per week, quite oblivious of the fact that the supply would cease long before we had any check on consumers. Incidentally, during the last five months we had a constant series of conflicting orders, and arguments with the Germans as to how the remaining fuel supplies should be dealt with.

In 1942, owing to the difficulty in obtaining fuel oil, the Germans arranged for a French firm to convert two of our Mirrlees-Diesel engines to run on the town gas supply. The conversion scheme was very cleverly carried out, but by the time it was completed, there was not sufficient gas to operate the sets.

In June, 1944, owing to the extreme shortage of fuel oil, we took over a partially completed steam station which had been erected by the O.T. Organisation for its own use. The plant consisted of two 1,000-kW turbines and three Babcock & Wilcox boilers about twenty years old. This station was run by our staff to continue the public electricity supply until January 25th, 1945, when the coal stocks were exhausted and the supply closed down altogether.

When the steam station shut down there was about 60 tons of fuel oil left, and the Germans ordered us to run a Diesel set for a

few hours daily for military purposes, but the men declined to do so, and they were supported in this by the management and the board. The Germans then offered, as a sop, to put on one of the local hospitals and two or three other civil institutions, and hinted that our refusal to run the engine would prejudice other negotiations which were being carried on in connection with food supplies. They were told that our refusal was a matter of honour, and that we were not prepared to barter our honour. The result was that one of our sets was requisitioned and run by the Germans themselves till they broke it. Then a second set was taken, and shared the same fate. They then took over a third, but shortly after that the British Forces arrived and saved the situation. Fortunately the damage to our sets is not as serious as it might have been, and £150 will probably cover the cost of repairs.

During " V.E. Day " the staff were working all out to get our consumers on the supply again, and the great majority were on in time to hear Mr. Churchill's speech, but it has taken about three weeks to get everything straight again, as during the time the Germans had control they cut down services and interfered with the mains all over the Island.

Behaviour of Administration

So far as the civil side of the German administration was concerned, they were very polite, and inclined to moderate the orders received from the Northern French Command as much as they dared, but this was not much. The administration was by no means efficient as we understand efficiency, and they had a mania for graphs and decimal places—for instance, they would measure a 100 ton fuel tank with a dipstick to three places of decimals. However, in spite of their polite veneer, they proved they were the same old Germans by their treatment of the Russian prisoners and foreign labour, and their better treatment of us can only be ascribed to their inherent respect for the power of the British Empire. Here it may be of interest to mention an incident that occurred after they had been in occupation about a year. The German who controlled oil supplies was ordered to Russia. He had been very decent, and I said I hoped his successor would be as helpful, to which he replied that he would. I remarked " So you know him ? " He replied " No ! I am going to Russia and shall probably be killed, so I will tell you—It is an *order*. We *have* to be polite."

It may be of interest to note that whereas the pre-war price of fuel oil was £4 per ton, the Germans commenced to supply this to us at £22 16s. per ton, which price eventually rose to £57 9s. per ton ex ship. This, of course, necessitated several increases in our tariffs, which have now risen to 7½d. per unit for power, and 10½d. per unit for lighting.

Owing to the complete lack of candles, paraffin, and finally of gas, for lighting, we have had a great many applications for the installation of electricity, and we were allowed to grant some of these as far as limited supplies of material would permit, priority being given in cases of illness, large families of children, and farms producing essential food supplies.

The maximum load fell from 3,560 kW in 1939 to 1,570 kW in 1944 and the sale of energy from 6,377,456 to 3,900,950 kWh. The dividend of 5 per cent. has been paid on the company's preference shares every year. An ordinary dividend of 5 per cent. was paid in 1942, 1943 and 1944, but there was no dividend in 1940 and 1941.

The occupation has certainly taught us how extremely wasteful we were in the use of many things in peacetime, and has also taught us to improvise. It should be possible to get up a really interesting exhibition of home-made gadgets which were produced during the last five years. Finally, may I say to our technical and business friends who used to visit us—we missed you, and missed you badly.

Proposed Sand-Blasting Regulations

FOR many years attention has been drawn in the annual reports of the Chief Inspector of Factories to the risk of contracting silicosis incurred by persons engaged in or in connection with " sand-blasting." In the light of recommendations by a Joint Committee on Dust in Steel Foundries the Minister of Labour proposes to make Special Regulations under the Factories Act, 1937, for factories in which " blasting " is done, and any objections to the draft should be lodged on or before July 24th.

The principal requirements of the Regulations include: (1) A general prohibition of the introduction of siliceous abrasives into blasting apparatus. (2) More elaborate protective measures than those at present prescribed by the Grinding of Metals (Miscellaneous Industries) Regulation, 1925—which the new code would partly supersede—in connection with " blasting " in or incidental to the cleaning of castings.

Income Tax Act

Limited Concessions to Industry

By a Barrister-at-Law

THE Income Tax Act which became law last week fundamentally affects the income tax computations of all industrial organisations; it is complicated and demands the closest consideration. It is not possible in the course of an article of this kind to discuss the details of the measure, but the broad general outlines are as follows:—The first part deals with buildings and structures. Previously it had been a generally recognised flaw in our income tax law that, apart from the allowance in respect of buildings containing vibrating plant or machinery under Section 15 of the Finance Act, 1937, no allowance could be claimed in respect of the depreciation of buildings.

Definition of "Industrial Building"

Under the new law, an initial allowance of 10 per cent. of the capital expenditure on construction may be claimed in respect of industrial buildings erected on and after April 6th, 1944. The capital expenditure will include the cost of the acquisition of the land including preparing or levelling. The term "industrial building" is defined to include a building or structure in use for the purpose of an electricity undertaking and would include a sports pavilion or other building for the welfare of the staff or workers but would exclude a dwelling-house, retail shop, showroom or office. The whole of a building of which not more than one-tenth is non-industrial is to be regarded as wholly industrial; where the non-industrial portion exceeds a tenth an apportionment will be necessary.

It is to be noted that the term "building" includes "a part of a building" and therefore if a building existing before April 6th, 1944, is enlarged or extended after that date, the enlargement or extension will rank for the allowance. If a building is sold before it has been used, then the purchaser is deemed to have incurred the cost of construction and may claim the initial allowance on that cost or upon the purchase price, whichever is the less.

The allowance comes into operation upon an "appointed day" to be fixed by Parliament, but any expenditure incurred after April 6th, 1944, is to be regarded as having been incurred on the appointed day. In addition, an annual allowance of 2 per cent. on the capital cost of the building may be claimed on the basis of a life of fifty years.

Thus a building erected in 1925 will be entitled to the annual allowance of 2 per cent. on the written down value from 1945 until 1975. After the appointed day, the mills and factories allowance will cease, but an undertaking may elect to remain under the present system in lieu of that contained in the Act for a period of five years. An attempt was made in the committee stage to extend the period of five years, and the Chancellor of the Exchequer, while refusing the extension, promised to review the position at a later date.

It is to be remembered that although the new annual allowance extends to all industrial buildings and is not confined to those containing vibrating machinery, in computing the capital value upon which the allowance is based, it will not be permitted to include the value of any plant or machinery contained in the building. Therefore the new allowance may not be greater in amount than the old in all cases.

The second part deals with plant and machinery, and grants an initial allowance of 20 per cent. on the cost of all plant and machinery incurred after April 6th, 1944. In addition, the agreed rates of depreciation increased by 25 per cent. can be claimed annually. There are still some undertakings which, in lieu of annual wear and tear deductions, have claimed the cost of renewals as and when incurred. It is not the intention of the Inland Revenue to withdraw the option to claim renewals but it is clear that under the provisions of the Act no initial allowance can be claimed in respect of that portion of the cost of the new plant which is represented by the renewal allowance.

Balancing Charges

Both as regards buildings and machinery the Act introduces a new principle into income tax law, which is known as the balancing charge or allowance. In the past, if plant or machinery was scrapped and replaced, an obsolescence allowance under Rule 7 of Cases I-II could be claimed if

the value of the plant and machinery had not been completely written off by the annual allowance, together with any value received on sale. If, on the other hand, the price obtained on sale exceeded the written-down value, no charge in respect of the sale became due to the Exchequer.

The new system may be illustrated as follows:—" A " installs plant at (say) £1,000. He at once obtains an initial allowance of 20 per cent. and every year the agreed depreciation rate, say 3 per cent. At the end of the fourth year the plant is written down for income tax purposes to, say £700, and it is then sold for £1,200. A capital profit of £500 has been made and this would have to be brought into tax subject to the limitation that the amount so brought into tax is not to exceed the allowances actually obtained, *i.e.*, £300. Similarly, if the sale had realised only £500, then £200 could be claimed as a balancing allowance.

Effect on Amalgamations

The purpose of the balancing charge or allowance is, in the words of Sir John Anderson, the correction, " in the light of ascertained facts, of the operation of the empirical allowance which is given year by year after the initial allowance." It should be emphasised that the Inland Revenue can only claim a balancing charge where the profit on a sale is not applied to the renewal of plant and machinery. Where the whole of the proceeds of a sale are utilised for the renewal of plant, no case for a balancing charge will arise. It was appreciated from the first that liability to a balancing charge might arise on an amalgamation of two undertakings, particularly where the purchase price is fixed by reference to maintainable profit. Where, on the apportionment of the purchase price to the physical assets, it is found that the value of the assets as written down by the vendor is exceeded, a claim for a balancing charge may be made by the Inland Revenue. M.P.'s pointed out that the possibility of such a claim might well act as a deterrent to many healthy amalgamations, but the Chancellor did not see his way to make any concession except in the case of holding companies and their subsidiaries.

Another point that may be mentioned is that the Bill will over-ride the decision of the House of Lords in the case of the Birmingham Corporation *v.* Barnes. In that case it was held that annual wear and tear allowances on plant are to be based upon the actual capital expenditure incurred in respect of that plant, notwithstanding the fact that some part of the expenditure has been defrayed from a subsidy. The Act provides that in future allowances are to be based upon the actual net cost to the taxpayer, but where a contribution has been made by an undertaker who would himself qualify under the Act for relief, such an undertaker may obtain the appropriate relief upon the contribution he makes.

Thus, as in the case cited in the House, a farmer might desire to obtain electricity and, to that end, instead of putting down his own plant, he might be willing to contribute £1,000 towards the work carried out by the electricity undertaking. Then the undertaking would be able to claim depreciation allowances on its net expenditure while the farmer would be given the appropriate allowance on his capital expenditure of £1,000.

Generally speaking, the Act has been welcomed by industry, especially as it tends to give immediate relief in a period of exceptionally high taxation. It is obvious, however, that the concessions which are foreshadowed are limited and entail corresponding disadvantages.

Loch Sloy Scheme

Excavation Work Begun

MRS. THOMAS JOHNSTON, wife of the former Scottish Secretary, cut the first sod in the excavation work for the erection of a power station for the Loch Sloy scheme of the North of Scotland Hydro-Electric Board on June 11th. The ceremony, which was attended by many representatives of public bodies, took place in a field on the west side of the Loch Lomond main road. Lord Airlie, chairman of the Board, said that a new era for the Highlands was beginning. The Loch Sloy project was an example of a profitable economic scheme by which both Highlands and Lowlands would benefit. The electricity generated by this scheme would go to Lowland industry where it was urgently needed.

Mr. Johnston, acknowledging a gift of a diamond ornament to his wife from the contractors, described the ceremony as a landmark in the economic development of the Highlands. The scheme, the first of many to be promoted by the Board, would cost over £4,000,000 and provide directly employment for 2,500 workers. It would take two years to complete. The electric power for the most part would be sold to the Central Electricity Board at steam coal station prices and the profits derived from the sales would be used to finance the two uneconomic schemes at Lochaish and Morar.

ELECTRICITY SUPPLY

Belfast Concessions. Fleetwood and Purchase Tax.

Belfast.—LOWER CHARGES.—In July, 1940, electricity charges to all classes of consumers with the exception of the shipyards were increased by 10 per cent. In the case of shipyards, supplies to which have been given under a special agreement, charges were increased by 5 per cent. The city electrical engineer has now recommended that these increases shall be discontinued as from July 2nd. The coal charge clause which at the same time was introduced into those tariffs not then subject to a coal cost increase is to be maintained.

Bristol.—DISTRIBUTION EXTENSIONS.—Urgent distribution extensions which are needed to maintain adequate supplies of electricity in the Knowle and Brislington areas are the subject of an application for sanction to a loan of £34,944, and for similar work in the Kingswood area permission is being sought to borrow £54,699. The Electricity Committee proposes to ask the Electricity Commissioners to cancel the unexpended balance of £232,000 of the sanction of £4,000,000 approved in 1939

ALL-ELECTRIC BUNGALOW.—The Lord Mayor recently opened an all-electric bungalow at the Blackswarth Road housing site.

Carlisle.—SUPPLY TO DWELLINGS.—The cost of extending the mains to 100 temporary houses at Dobinson Road is estimated at £950. The cost of services, to be charged to the Housing and Development Committee, is £600.

Cheltenham. — EXTENSIONS. — The Electricity Committee is to provide a supply to the Lynworth Farm estate at a cost of £12,905.

Chester. — LOANS FOR EXTENSIONS. — The Electricity Committee has obtained sanction to borrow £2,730 for supply to farms and cottages in the Rushton and Ox Heys districts, and £7,000 for extensions in the Lache area. Application has also been made for sanction to borrow £4,950 in respect of supply extensions in the parishes of Carden, Handley, Tattenhall, Utkinton, Waverton and Willington.

COMPLETION OF SUBSTATION.—The electrical engineer has been asked to prepare a scheme for constructing the remainder of the main switching substation at New Crane Street.

Chesterfield. — PETITION FOR SUPPLY. — A petition for a supply of electricity has been received by the Electricity Committee signed by 79 residents of the villages and hamlets of Cutthorpe, Ingmanthorpe, Pratt Hall and Overgreen. The Electricity Commissioners have been approached with a view to obtaining their approval to the scheme previously submitted.

DISTRICT HEATING.—At a meeting of the Housing Committee the chairman reported that he and the borough engineer had visited Dundee and inspected installations in operation there for the provision of hot water supplies from a central source for domestic and central heating. He added that the Minister of Fuel and Power had appointed a Committee to consider and report on the question of district heating installations. The Housing Committee came to the conclusion that the present was not an opportune time for the adoption of such a scheme on Council estates but that the matter should be reconsidered when the report of the Ministry was available.

Dingwall.—STREET LIGHTING.—Electric street lighting is to be installed at a cost of over £3,000.

Dover.—TEMPORARY HOUSES.—The borough electrical engineer has reported to the Electricity Committee on the cost of supplying electricity to 148 temporary houses to be erected on the Buckland estate. Permanent work is estimated to cost £4,437 and temporary work £1,392.

Felling (Co. Durham).—ALL-ELECTRIC HOUSES. —The Urban District Council is to build fifty-five all-electric houses at The Drive.

Fleetwood.— COST OF ELECTRICAL APPLIANCES.—The Electricity Committee has decided to discontinue the hire of domestic electrical apparatus owing to its high cost. The view of the Committee is that purchase tax should be abolished upon all domestic electrical equipment. It was stated that immersion heaters which cost £2 10s. before the war were now priced at £8 10s., while electric clocks had advanced from £3 to £9 5s. 6d.

Fort William.—USE OF DOMESTIC APPARATUS. —It was reported to the Electricity Committee recently that permission had been given for the supply of power for several electric cookers for the summer season only. It was agreed to write to the Electricity Commissioners to ascertain if increased supplies could be sanctioned to allow of more extensive use of electrical appliances, particularly as the electricity is water-generated, and there would thus be a saving in other types of fuel.

Merthyr Tydfil.—STREET LIGHTING.—The Public Works Committee has decided to invite tenders for the lighting of the town. Most of the street lighting in the town at present is by gas.

Rothesay (Bute).—TRANSFER OF UNDERTAKING.—Subject to the approval of the Electricity Commissioners, the Town Council is to transfer its electricity undertaking to the North of Scotland Hydro-Electric Board on May 15th, 1946, under an agreement providing for the comprehensive use of electricity within the burgh, and a general reduction in the present scale of charges by the autumn of 1947. The Board hopes to have in operation a new water-power station at the head of Loch Striven, and it has prepared a distribution scheme in South Cowal and the islands of Bute and the Great Cumbrae, with one also for North Cowal. The Board intends to take over the existing permanent part of Rothesay electricity undertaking, and will give special consideration to the training and employment of local people.

Swansea.—DISTRIBUTION EXTENSIONS. — A scheme submitted by the borough electrical engineer for the extension of the high-voltage distribution system was adopted by the Electricity Committee at its last meeting. Outlining the scheme, the engineer said that none

of the expenditure, estimated at £134,000, would be necessary but for the proposed estates. He estimated the cost of high-voltage cables, substations and distributor cables and services for the 2,100 houses on the Penlan estate at £90,800 and the cost of supply to the Fforestfach factory site at £43,200, excluding any cost in respect of building substations and the laying of low-voltage cables. He hoped that the Housing Committee would provide all the houses initially with electrical equipment.

Wigan.—RESULT OF YEAR'S WORKING. — It was reported to the Town Council at its last meeting that the 1944-45 year's working of the Electricity Department had resulted in a net profit of £28,517, compared with £54,794 in the previous year. During 1944 the Corporation increased the discount rate to consumers, at a cost of £17,277, reduced the tariff to contract consumers and bulk supply consumers and placed the supply to the outer districts on the same basis as in the borough. The chairman of the Electricity Committee said that the Department expected to have to spend £156,000 on new plant.

Wolverhampton.—EXTENSIONS.—The Electricity Committee is seeking sanction to borrow £29,950 for extending the distribution system to housing estates at Bushbury and Henwood Road, Tettenhall, and £14,380 for improvements to mains, etc.

TRANSPORT

Torquay.—CLIFF RAILWAY.—Dr. Oscar Faber, consulting engineer, has informed the General Purposes Committee that labour and material for the improvement and enlargement of the Babbacombe cliff railway will not be available for some time. The Committee has asked him to undertake all necessary preliminary and provisional work.

Municipal Reports

Carlisle

THE report of Mr. A. C. Thirtle, city electrical engineer and manager at Carlisle, for the year ended March 31st last shows that there was a net surplus on revenue account of £4,050 compared with a deficit of £7,929 in 1943–44. This result was due largely to a small increase in tariffs in October, 1943. Revenue advanced from £223,248 to £249,030 and working expenses from £177,186 to £186,728, costs per kWh sold rising from 1·28d. to 1·35d.

The total quantity of electricity sold was 44·1 million kWh (15·4 million in the rural area) against 41·2 million in the previous year, an increase of 6·9 per cent. The continued growth of farm consumption was again an outstanding feature. Domestic supplies under the two-part tariff were 12·7 per cent. greater while there was a small decrease in flat-rate consumption. A comprehensive scheme was prepared for supplies to 1,029 premises in the rural area at a cost of £220,000, with an estimated gross revenue of 3½ per cent. of the outlay. The Electricity Commissioners were informed but they stated that they could see no possibility of any Government assistance for such schemes at present.

On the generation side, the report states that the Willow Holme station was in continuous operation during the year and the plant forming the second extension was put into commission during the last quarter. A total of 256·8 million kWh was sent out, the average cost being 0·501d.; in the previous year the output was 170·4 million kWh and the average cost 0·499d. Fuel consumption was reduced from 1·418 to 1·312 lb. per kWh generated. The thermal efficiency on kWh sent out improved from 20·97 to 22·6 per cent.

Belfast

At Belfast the past year has been an eventful one. At conferences with representatives of the Ministry of Commerce recommendations for the future supply of electricity in Northern Ireland were agreed; with certain modifications these have been approved by the Corporation and passed on to the Ministry. There has been a controversy between the Ministry and the Corporation on the question of whether new plant should be installed at Ballylumford or the Harbour power station, and the Ministry is obtaining the opinion of Sir Johnstone Wright, of the C.E.B. On January 23rd last the jubilee of the Belfast undertaking was celebrated.

The report of the city electrical engineer and general manager (Mr. W. J. McC. Girvan) states that the revenue from the sale of electricity and from the hire of appliances, etc., amounted to £1,537,871, an increase of £169,831, and working costs were £118,174 up at £1,042,100, the net surplus being £107,228.

The total quantity of electricity sold was 388·8 million kWh, including 142·2 million kWh in bulk supplies to the Ministry of Commerce and the Electricity Board for Northern Ireland. This was 30·4 million kWh (8·5 per cent.) more than in the preceding year. Domestic supplies increased by 13·4 per cent. to 48·4 million kWh. The total number of consumers at March 31st last was 88,202, an additional 1,047 having been connected during the year. As from July 2nd additions to charges imposed in 1940 are being removed.

Following the removal by the Government of the restriction on the use of armoured cables, the Electricity Committee approved the return to the pre-war policy of providing consumers' distribution and service cables under guarantee, as from June 1st this year. Capital payment by the consumer is no longer required except for service cables over 30 ft. long on private property.

Owing to the terms of the lease, the central showrooms were closed last February and the Department is seeking new premises. The engineer in his report expresses the hope that at an early date the Government will withdraw the purchase tax on domestic appliances.

The Harbour power station generated 342·8 million kWh during 1944-45 and despite the inferior grades of fuel the overall operating efficiency was higher. The coal stock at the station at one time fell so low that it was necessary to transfer from the East Bridge Street station 3,500 tons of coal held as emergency stock.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The British Thermostat Co., Ltd., reports a trading profit to January 31st last of £176,579, to which are added interest and fees, etc., making £179,573 (against £168,596). The net profit is £22,611 (£20,924). A sum of £5,000 (same) is allocated to reserve, the dividend is maintained at 18½ per cent. by a final distribution of 11 per cent. and £21,569 (£17,832) is carried forward.

In a statement accompanying the accounts the chairman, Colonel N. Hudson, says that the cessation of hostilities will probably imply a considerably reduced turnover, but so as to ensure that no future source of revenue will be left unexploited, the commercial and aircraft sections of the company's business have been separated and the aircraft work turned over to the subsidiary, Teddington Controls, Ltd.

The Harland Engineering Co., Ltd., reports a trading profit for 1944 of £196,541 (against £156,821) to which is added £833 (£1,738) income from investments, including dividend from subsidiary company. The net profit is £16,678 (£15,593) and £13,996 is brought in. Appropriations include the transfer of £7,000 (same) to general reserve which has also been augmented by £1,674 surplus from the sale of one of the company's properties and £3,083 surplus on switchgear goodwill account. As already reported, the ordinary dividend is increased from 6 to 7 per cent. and £14,800 is carried forward.

Whitehall Electric Investments, Ltd., reports an income for 1944-45 of £126,397 (against £115,272 for 1943-44). Income tax and the net preference dividend absorb £100,699 and the balance carried forward is increased by £25,698 to £394,419. Investments realised resulted in a loss of £208,346, of which £65,756 has been charged against revenue and £142,590 against depreciation reserves. The consolidated assets, excluding Athens, where services are now being re-established, are valued for the ordinary stock at £3,177,216 (against £2,603,032).

The Boston & District Electric Supply Co., Ltd., reports a net revenue for 1944 of £41,703. A final dividend of 6 per cent. is paid, making 10 per cent. for the year, and £11,674 is allocated to reserve. A sum of £16,147 (£14,142) is carried forward.

The Colne Valley Electric Supply Co., Ltd., shows a balance on revenue account for last year of £62,843. With a final dividend of 4½ per cent. the total distribution for the year is 7 per cent. A sum of £19,623 is placed to reserve and £39,559 (£37,614) is carried forward.

The Musselburgh & District Electric Light & Traction Co., Ltd., states that the income for 1944 amounts to £15,453, the net profit being £4,724. The ordinary dividend for the year is 3 per cent., £3,333 is placed to reserve and £5,476 (£5,606) is carried forward.

The Lewes & District Electric Supply Co., Ltd., reports a revenue for 1944 of £17,314 (against £15,279) and a balance, after taxation and expenses, of £7,213 (£5,611). The dividend is maintained at 10 per cent., general reserve receives £3,750 (£3,500) and £3,462 (£3,449) is carried forward.

The Northwood Electric Light & Power Co., Ltd., announces a trading revenue for last year of £213,050 and a balance of £59,529. The ordinary dividend is 8 per cent., £14,744 is transferred to reserve and £15,780 (£15,261) is carried forward.

The Sheerness & District Electric Supply Co., Ltd., is paying a dividend of 8 per cent. (same). The accounts show a revenue for 1944 of £34,194 against £33,125 for the previous year and a net profit of £15,529 (£15,595). General reserve again receives £10,000 and £7,814 (£6,685) is carried forward.

The Notting Hill Electric Lighting Co., Ltd., is paying one year's dividend arrears on the £200,000 of six per cent. cumulative preference shares to December 31st, 1943.

Lacrinoid Products, Ltd., proposes to issue 300,000 new 2s. shares at 4s. per share to provide capital for development and expansion of the company's business. Treasury sanction has been obtained.

The General Cable Manufacturing Co., Ltd., is again paying an interim dividend of 6 per cent.

New Companies

Amalgamated Radio and Domestic Appliances, Ltd.—Private company. Registered June 11th. Capital, £10,000. Objects: To carry on the business of wireless and television experts, manufacturers and dealers, electrical engineers, manufacturers of, and dealers in, domestic and other appliances, etc. Directors: H. H. Miller, 570, Brunshaw Road, and W. Greenwood, 96, Branch Road, both Burnley (both directors of Amalgamated Relays, Ltd.). Registered office: 8, Standish Street, Burnley.

Wessex Wholesale Electric, Ltd.—Private company. Registered June 12th. Capital, £30,000. Objects: To acquire the business of electrical wholesalers carried on by R. E. Tucker and A. E. Hayward at Wine Street, Bath. Directors: R. E. Tucker, Juneland, Warminster Road, Bathampton; and A. E. Hayward, 9, Bloomfield Grove, Bath. Registered office: 7 and 8, Wine Street, Bath.

Fox & Co. (Childwall), Ltd.—Private company. Registered June 12th. Capital, £1,000. Objects: To carry on the business of electricians, electrical, radio and mechanical engineers, manufacturers of, and dealers in, refrigerators, vacuum cleaners, etc. Directors: J. G. Hall, 59, Strand Park and Wm. J. R. Fox, 118, Dunbabin Road, both Liverpool 16. Registered office: 249, Woolton Road, Liverpool.

Stewart Thomson & Sons (Liverpool), Ltd.—Private company. Registered June 13th. Capital, £15,000. Objects: To acquire the business of an electrical and mechanical engineer and manufacturer carried on by Stewart R. Thomson at Fort Road, Seaforth, Liverpool, as " Stewart

Thomson & Sons." Directors: S. R. Thomson, 26, Stanley Park, Litherland, Liverpool, and four others. Registered office: Gladstone Works, Fort Road, Seaforth, Liverpool 21.

Electrical Agencies (Belfast), Ltd.—Private company. Registered in Belfast May 22nd. Capital, £3,000. Objects: To acquire the business of a wholesale merchant, factor, agent, importer and distributor of electrical and radio equipment, appliances, and accessories, etc., carried on by T. J. Stockman, at 32, College Street, Belfast, as Electrical Agencies. First directors: T. J. Stockman, and Mrs. Ethel R. Stockman, both of 9, St. Johns Park, Belfast. Registered office: 32, College Street, Belfast.

Friary Electrical Co., Ltd.—Private company. Registered June 7th. Capital, £100. Objects: To acquire the business of C. Smaje, electrical engineer and contractor, and to carry on the business of manufacturers of, and dealers in, electrical installations for motor vehicles, boats, flying machines, cycles and radio, etc. Directors: C. Smaje and Mrs. Hilda M. Smaje, both of 8, Churchfield Road, W.3. Registered office: 8, Churchfield Road, W.3.

British Neon Manufacturing & Installation Co., Ltd.—Private company. Registered June 9th. Capital, £1,000. Objects: To carry on the business of designers, manufacturers and installers of, and dealers in, illuminated and other signs, etc. First directors: A. R. Cundell, 25, Telegraph Street, Cottenham, Cambs., C. Unwin, 3, Rosemary Lane, Cherryhinton, Cambs., and T. R. Ready, 35, Norfolk Street, Cambs. Registered office: 25, Telegraph Street, Cottenham.

Diesel & Electrical Engineering, Ltd.—Private company. Registered in Edinburgh May 29th. Capital, £500. Objects: To carry on the business of manufacturers of Diesel and other internal combustion engines and power units of all types, electric motors, appliances and equipment, etc. Directors: W. A. Cook, Freeland House, Bridge of Weir; and J. S. Dargie, 56, Eldon Street, Glasgow. Registered office: 105, West George Street, Glasgow.

Surrey Electrical Installations, Ltd.—Private company. Registered June 6th. Capital, £750. Objects: To carry on the business of electrical engineers, etc. Directors: R. L. White, 61, Sunningdale Road, Cheam; J. L. Tuckfield, 57, Ewell Downs Road, Ewell; and G. P. Miles, 53, Ashridge Way, Sunbury, Middlesex. Registered office: 27, Station Way, Cheam, Surrey.

Hamel & Co. (London), Ltd.—Private company. Registered June 7th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, electrical and other automatic control equipment, indicating mechanism for use in premises, ships and aircraft; optical, refrigerating and other apparatus, etc. Directors: A. J. Ward, 85, Spring Grove Crescent, Hounslow, and F. G. Hoare, 28, Newlands Road, S.W.16. Secretary: M. I. Carden. Registered office: 11, Buckingham Street, W.C.2.

Oswald Jones (Wrexham), Ltd.—Private company. Registered May 18th. Capital, £2,000. Objects: To carry on the business of electrical and radio engineers, etc. First directors: O. Jones (permanent managing director) and Emily C. Jones, both of Sandford, Wats Dyke, Way Garden Village, Wrexham; and J. Jones, 62, Beechley Road, Wrexham. Registered office: 4, Lambpit Street, Wrexham.

Scottish Electric, Ltd.—Private company. Registered in Edinburgh June 4th. Capital, £1,000. Objects: To carry on the business of electrical, constructional, mechanical, heating, ventilating and general engineers, etc. J. W. Budge, 31, Murray Street, Dundee, is the first director. Registered office: 163, Seagate, Dundee.

Companies' Returns

Mortgages and Charges

E. Dyne & Co., Ltd.—Mortgage on proceeds of contract, dated June 1st, 1945, to secure all moneys due or to become due from the company to Midland Bank Ltd.

J. & W. Wade (London), Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated May 28, 1945, to secure £5,000 (ranking *pari passu* with existing debentures for £1,500 and £1500) to Branch Nominees, Ltd.

A. F. Bulgin & Co., Ltd.—Satisfaction in full on January 15th, of charge dated August 10th, 1939, and registered August 24th, 1939, securing all moneys due or to become due from the company to Westminster Bank, Ltd. (Notice filed May 28th.)

Claytelec, Ltd.—Mortgage dated May 26th, 1945, to secure all moneys due or to become due from the company to Midland Bank, Ltd., charged on moneys under contract.

Ergon Electrical Manufacturing Co., Ltd.—Satisfaction to the extent of £2,500 on December 6th, 1944, of debentures authorised August 5th, 1936, and registered August 26th, 1936. (Notice filed May 17th, 1945.)

Winding-up Petition

Princely Radio & Television Corporation (of Great Britain), Ltd.—A petition for the winding-up of the company will be held on June 25th, at the Royal Courts of Justice, Strand, London.

Winding-up Order

B. and B. Batteries, Ltd.—An order for the compulsory winding-up of this company was made by Mr. Justice Cohen on June 18th.

Bankruptcies

T. Maund, electrical engineer, lately carrying on business at 80, Wellington Road North, Heaton Norris, Stockport, as the "Beacon Electrical Co."—Application for discharge to be heard on July 4th, at the Court House, Vernon Street, Stockport.

A. C. W. Wilson, electrical engineer, Wepre Higher West Cross, Swansea, and lately residing at 7, Glanmor Road, Sketty.—Application for discharge to be heard on August 8th at the Law Courts, Guildhall, Swansea.

C. R. G. Webb, electrical engineer, trading as "Southern Electrical Mechanical Co.," 146A, Eastern Road, Brighton, and formerly at 94, George's Road, Brighton.—Proofs for dividends by June 29th to the trustee, Mr. A. C. Williams, Official Receiver, 8, Old Steine, Brighton.

STOCKS AND SHARES

TUESDAY EVENING.

UNTIL the General Election is out of the way, the Stock Exchange markets will remain under the influence of politics. To a large extent, however, the nervousness has worn off under the pressure of a steady flow of money into industrial investments. Prices retain their previous recovery, and in some cases have made further progress towards wiping out the earlier losses. Dividends and reports are almost uniformly good. There is an occasional exception but on the whole companies' affairs are satisfactory.

Home Electricity Supply

The threat of nationalisation directed against the electricity supply industry continues to exercise a slightly depressing effect upon the market in the ordinary shares of the leading companies. Holders who have sold their shares maintain that the outlook is obscure, and that quotations stand sufficiently high to preclude the likelihood of any further material advance while, at the same time, they present vulnerable targets. Some of the sellers announce that they intend to come back into the market on a lower level of quotation if the decline goes further. Bournemouth and Poole at 62s. 6d., and Lancashire Light and Power are both down 1s.

Equipment and Radio Shares

Associated Electrical Industries at 56s. 9d., are 1/16 higher and Automatic Telephones hold their rally to 68s. 6d. Henley's are a few pence harder at 27s. 3d. General Electrics hardened to 96s. and Tube Investments to 5½. De la Rue, which spurted to 10⅞ last week, went back to 10⅝. Active dealings in A. C. Cossor shares lifted the price 1s. to 37s., but Philco, which often move in correspondence, held to 14s. 6d. Pye deferred at 33s. 6d. are 1s. better, and E.M.I. at 34s. 6d. are unchanged.

The Cable Merger

British Insulated at 6⅛ and Callender's Cable at 6 7/16 are ex net dividends of 1s. and 2s. 6d. respectively. The merger meeting is to be held on June 29th. The proposals for amalgamation deserve every support, but the resolution for payment of £160,000 as compensation to the directors for loss of office should arouse strong protest. This enormous sum, moreover, is to be paid, if the shareholders pass the resolution, free of income-tax to the recipients.

Miscellaneous Movements

Indian shares are again a good market. Calcutta Trams at 74s. 6d. have risen a florin, Calcutta Electrics 3s. 6d., to 54s., Cawnpore Electrics 1s. to 52s., and Delhi Electric 2s. to 70s. 6d. Cable issues have a gain of a dollar, to 36, in International "Tel. & Tel." and a fall of 1s. to 18s. in Canadian Marconi, as two of their features. Cable & Wireless ordinary at 86, allowing for deduction of £2 net dividend, is 10s. lower. Brazilian Tractions, after touching 29¾, fell back to 28½, before rallying to 29⅜. Shares in the "heavy" industries have belied the adjective, and at 56s. 9d. Babcock & Wilcox have participated in this market's improved tendency.

Home Railway Stocks

The possibility of the Home Railways becoming nationalised is likely to be present in the stock market for some time to come, whichever political party is returned to power next month. Prices in that department have now got down to levels at which yields ranging from 7½ to 9 per cent. can be obtained from the junior stocks. London Passenger Transport "C" is an exception, returning at 67½, a trifle less than 4½ per cent. on the money. Southern Railway 5 per cent. preferred has weakened to 72, and the 5 per cent. preference at 115½ is 8 points down since the end of May.

British Electric Traction

The British Electric Traction Co. is maintaining its now usual dividend of 45 per cent. on the deferred stock, subject to tax at 9s. 10½d. in the £. Revenue increased by £11,500 for the year ended March 31st last, but income tax took £317,791, and the net revenue comes out at £7,300 higher on the year. The company's investments stand at £6,925,400, which is about £130,000 up, as compared with a year ago. The B.E.T. Electricity Supply and the B.E.T. Omnibus Services, are directly controlled by British Electric Traction, whose deferred stock at 1,200 pays £3 15s. per cent. The 8 per cent. preferred ordinary stock returns four guineas per cent. The apparent anomaly of the deferred stock paying less than the preferred is explained, of course, by the fact that anticipation looks for the B.E.T. to resume at some future date the bonus distribution of stock to the deferred holders.

New Issues

The East African Power & Lighting Co. has issued 357,083 new ordinary shares for subscription by existing shareholders at 29s. in the proportion of one new ordinary for every three preference or ordinary held. Payment for the shares must be made not later than the last day of this month. The subscription to the issue was guaranteed by the Power Securities Corporation, which pays all expenses in consideration of a commission of 3¾ per cent. on the nominal amount of the shares issued. The price of the new shares is 3s. 6d. premium over the 29s.

The Treasury has now relaxed part of the ban hitherto placed upon new issues, and a number of fresh applicants for public favour may be expected within the course of the next two or three months. Several of them are known to be coming from companies connected with the electrical and kindred industries.

French Railways

Progress of Electrification

From Our Paris Correspondent

THE electrification of the French railways is to go ahead with all speed, and a report has been drawn up sketching plans for the immediate future. The first project, which is already under way, is the electrification of the Paris-Marseilles line, the most important section of which—Paris-Lyons—will be completed first. 4,000-HP locomotives operating at 1,130 V will be used with the possibility of temporary overloads to enable the locomotives to work up 6,500 HP on favourable stretches for 15-min. periods. This will bring about a complete change in the timetables and will cut the margin allowed for delays to 10 per cent. For example, trains with a maximum speed of 100 km. per hour will be scheduled at 90 km. for the whole run, cutting the time by as much as 1 hr. 20 min.

Railway substation at La Loupe

At the moment France has some 3,531 km. of double track electrified including main and suburban lines, or no more than one tenth of the complete network. Installed power is 600,000 kW divided between 178 substations and the total consumption of energy per year is 700 million kWh.

The Paris-Lyons line will add 512 km. and the section between Paris and Dijon will be four-track. Between Paris and Lyons there will be 52 substations each with 4,000-kW rectifiers. The substations will be placed 8 km. apart on the Lyons-Dijon section and in two groups between Paris and Dijon. On those sections where traffic is heavy the substations will be in groups of three and will be able to provide a total power of 376,000 kW or 730 kW per km. The substations will be operated from three remote control points situated at Dijon, Paris and Lyons and will be fed by two 60-kV lines from eight different production centres, and four 220-kV lines from the Pyrenees, Massif Central, Alpes and Genissiat hydro-electric plants.

The cost is expected to amount to 3,300 million francs. The annual consumption will be 400 million kWh (high voltage). Materials to be used will amount to 10,000 tons of iron and steel, 8,500 tons of non-ferrous metals such as copper, etc., and 5,000 tons of aluminium.

Following the electrification of the Paris-Lyons line power will be extended to Marseilles. Then will come the electrification of the Macon-Culoz line and Lyons-Geneva section, so that once this network is completed it will be possible for electric locomotives to run from Paris to Rome and even as far as Reggio de Calabria. Other lines to be electrified later include the Paris-Montaubon line (206 km.) and the Sete-Nîmes line (78 km.). This will complete the electrification of the whole network of the Paris-Marseilles section. The electrification of suburban lines of the Northern division of the S.N.C.F. will also go ahead as soon as possible. This will include Paris-Pontoise, Paris-Heumont, etc., and will amount to 160 km. The Western Division, which is already electrified for the most part, will be extended.

Development in Cornwall

BEFORE the Cornwall Branch of the Rural District Council's Association recently, Mr. A. C. Owen, general manager of the Cornwall Electric Power Co., spoke of the development of electricity in the county and said that up to the end of 1944 the capital expended by the company was £2,400,000. The number of premises in the company's distribution area was 81,089, and the number to which a supply of electricity was available within 50 yd. of the existing l.v. mains was 61,639. There were approximately 515 towns, villages and hamlets in the company's area, and electricity had been made available in 295. The company was now preparing for post-war development. Work had started on extending the Hayle power station, and Fraddon substation was being enlarged to deal with additional loads. In a five-year programme 202 additional villages and hamlets and an additional 18 borough and urban areas would be provided with electricity.

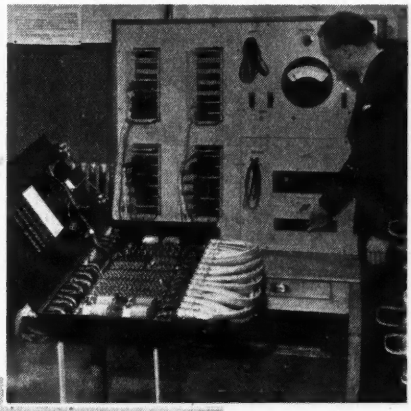
Manufacturers' War Work—VI

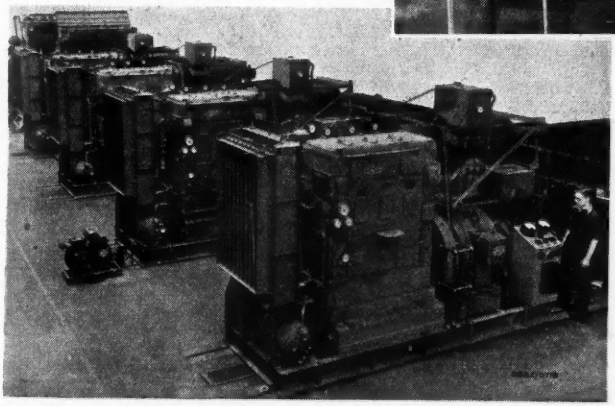
Important Contribution by the Brush and Petters Group

In addition to generating plant, oil engines, transformers, switchgear and arc welding plant, the Brush factories at Loughborough have been producing aircraft, vehicle bodies, gun mountings, degaussing equipment, etc., in large quantities.

APART from a large number of turbines and generators to meet electricity supply requirements in this country, special apparatus built by the Brush Electrical Engineering Co., Ltd., since the beginning of the war has included generating plant for the "Mulberry" harbours and for restoring harbour facilities, as well as two 7,000-kW and five 1,500-kW turbo-alternators for Russia. The U.S.S.R. has also been sent a number of electric trucks. Throughout the war period motor-generators have been supplied in large quantities for the Admiralty, whose earliest contracts also called for paravanes and degaussing equipment. Arc welding requirements for the Services have resulted in the development of special apparatus for ship-welding and other purposes.

About 6,000 gun mountings for Churchill and other tanks have been produced, in addition to bridge equipment and thousands of boxes of different kinds, cartridge bags, canvas curtains for generator sets, etc. A particularly meritorious achievement has been the production since 1940 by about 200 women, all "new labour" from shops, domestic service, etc., of 53,000 aircraft generators. Other special work undertaken for the M.A.P. has been the making of about 1,400 sets of wiring assemblies for the Lancaster and Halifax bombers, maximum production reaching fifty sets a week. One of the latest products, which is being produced in collaboration with Mavor & Coulson, Ltd., is a "Joy" shuttle car for use in mines. The first of these machines is just nearing completion.



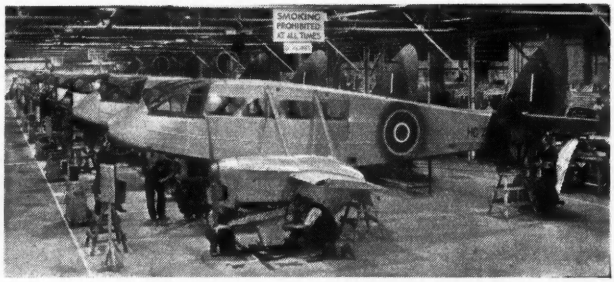


Junction box and test panel for the Lancaster wiring assemblies and (left) a group of 120-kW portable generator sets, comprising Petter "Super-scavenge" oil engines and Brush generators

Among vast quantities of transformers may be mentioned six hundred of up to 500 kVA for the equipment of aerodromes, units of 7,500 and 10,000 kVA for use as emergency spare transformers, several hundreds of various sizes for helping to restore supplies in France, many types for the Admiralty and considerable numbers of small transformers for the U.S. Army for use on the Continent in giving supply to stores, camps, etc.

Thousands of switchboards for use in conjunction with small "Petter" petrol-driven generator sets include many mounted on top

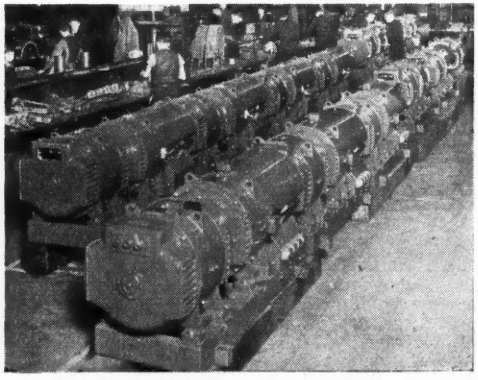
of the generators for use in the field. Nearly 300 special switchboards were supplied for cranes used in connection with the Invasion, and besides cubicle type switchboards for the Admiralty shore establishments all over the world, a considerable number of special boards have been produced for destroyers and corvettes for gun laying and fire control. For service in India 420 fully automatic mains failure switchboards have been specially designed and treated for use in conjunction with Diesel engines for signal purposes.



The Dominie training aircraft production shop

A considerable quantity of high-voltage and medium-voltage switchgear has also been supplied for use with turbo-alternators and large engine driven alternators for U.S.S.R. and M.O.S. requirements and for the equipment of a large radio transmission station in this country handling Middle East and Far Eastern traffic.

Since the outbreak of war, production of Petters, Ltd., an associated company has been greatly accelerated. Of the well-known "Superscavenge" engines about 5,000 HP has been supplied to the Ministry of Works, for use in driving plant and electric generators for ordnance factories and as standby installations for A.R.P. work. Machines totalling about 2,000 HP, direct-coupled to



Motor generator sets for the Admiralty

AC generators, have been installed by the Anglo-American Oil Co., Ltd., to deal with the important duty of oil distribution. For the Ministry of Supply, apart from over 2,000 HP in engines for marine propulsion, engines totalling over 10,000 HP have been supplied with generators as self-contained sets for operation in various parts of the world to supply electricity to meet emergency conditions.

A further 4,000 HP in electric generating sets has been required by the Air Ministry to provide electricity on aerodromes, about 3,000 HP in marine propulsion engines for the Admiralty for installation in minesweepers, with another 2,500 HP for coastal vessels, and 9,000 HP supplied in course of construction for marine auxiliary sets. For the Metropolitan Water Board five portable trailer sets totalling 1,250 HP have been supplied for A.R.P. duties.

The company's wartime production of small engines has been confined chiefly, and during the past four years entirely, to the manufacture of air-cooled engines in sizes from 1½ to 8 BHP and approximately 48,000 of these power units have been supplied. Of these 29,250 have been in sizes from 1½ to 3 BHP 1,750 and 17,000 of 8 BHP. About 37,000 of the total have been Government contracts. They have been used for a variety of duties ranging from small electric lighting sets and pumping sets and paint-spraying plants to portable air compressors aircraft servicing equipment. Progress in aerodynamics has made possible the development of the system of air cooling embodied in these engines, which have been sent to remote parts of the world to operate under extreme climatic conditions.

Of the smaller sizes also about 9,000 have been allocated for agricultural work in this country and a few have been released for export.

The production of Dominie training aircraft and the repair of Hampdens and Lancasters

has required a considerable extension of the factory operated by another Brush associated company, Brush Coachwork, Ltd., which has also succeeded in making over 550 new bus bodies, 3,450 radiolocation vehicle bodies, 2,300 general service wagon bodies, 1,150 gun carrying wagon bodies, 700 wireless and signal bodies and 600 other vehicle bodies.

Colombian Electrical Imports

Predominance of the United States

THE principal electrical imports into Colombia in 1943 are shown in the accompanying table, with a note of increase or decrease compared with 1942. The figures are taken from the statistics of foreign trade issued by that country. The exchange value of the Colombian peso may be taken as 7 to the £.

Class	1943 Pesos (000)	Inc. or dec.
*Generators**	197	− 153
*Generator parts**	4	+ 3
Transformers	148	− 72
From United States	141	− 29
„ Argentina	2	+ 2
Motors	211	+ 38
From United States	184	+ 41
„ United Kingdom	2	—
„ Switzerland	25	+ 16
*Motor parts**	15	+ 11
Batteries and accumulators up to 2 kg.	54	+ 29
From Argentina	23	+ 23
„ United States	31	+ 6
Ditto over 2 kg.	330	+ 195
From Argentina	104	+ 104
„ United States	220	+ 85
Pocket batteries	137	− 4
From Canada	34	+ 34
„ United States	74	− 67
Domestic appliances over 200 gr. net	36	− 114
From United States	29	− 92
„ Switzerland	3	+ 2
Accessories for domestic appliances	16	+ 11
From United States	11	+ 9
„ Brazil	5	+ 3
*Radio valves**	32	− 16
Radio receiving apparatus	476	− 24
From United States	456	− 44
„ Argentina	9	+ 9
*Radio transmitting apparatus and parts**	142	+ 19
*Radio parts**	77	+ 12
Telegraph apparatus and parts	23	+ 21
From United States	8	+ 7
„ United Kingdom	14	+ 13
Telephone apparatus and parts	153	+ 75
From United States	103	+ 46
„ Sweden	46	+ 25
Filament lamps	600	+ 318
From United States	559	+ 289
„ United Kingdom	40	+ 38
Torches and pocket lamps	8	− 13
From United States	3	− 18
„ Argentina	5	+ 5
*X-ray apparatus**	29	− 41
*Electro-medical apparatus**	23	− 3
Measuring and registering instruments less than 1 kg.	9	− 9
From United States	4	+ 1
„ Switzerland	5	—
Ditto, over 1 kg.	130	+ 92
From United States	33	− 3
„ Canada	17	+ 16
„ Switzerland	80	+ 79
*Refrigerator parts**	26	+ 9
Switches, circuit-breakers, etc., under 200 gr.	128	+ 26
From United States	76	− 24
„ Argentina	52	+ 52
*Ditto, over 200 gr.**	209	− 32
Other electrical apparatus and materials	232	+ 90
From United States	202	+ 78
„ Canada	1	− 1
„ United Kingdom	10	—
„ Argentina	12	+ 12
Insulated copper cable	639	+ 615
From United States	327	+ 311
„ Canada	3	− 5
„ Brazil	233	+ 233
*Insulated electrical cable, iron or steel**	20	− 49

* Mainly from United States.

It will be seen that the import trade as a whole increased, notably in copper cable, while a fall in the imports of generators was partly offset by an increase in those of motors and parts. Business in lamps, telephone apparatus, accumulators and batteries was active, but imports of domestic appliances declined. The United States was the predominant supplier, but Argentina made a noticeable appearance in some of the smaller lines, and Brazil took more than a third of the copper cable orders.

Last year the three major power producers increased their output by nearly 10 per cent. over 1943. The total was 338,230,000 kWh.

Import control and tariff protection on approximately their present scale are likely to continue for some years. However, in the opinion of the Bogotà branch of the Bank of London and South America, every opportunity exists for the United Kingdom to do a good business.

Institute of Welding

THE annual report, with accounts, of the Institute of Welding for the year ended March, 1945, explains the recent reorganisation. The research section has been converted into an independent British Welding Research Association with a Council of its own, while the Council of the Institute itself has been reduced in size and regional committees have been appointed at provincial branches. The net increase of membership during the year was 1,255, raising the total to 4,506. An appeal to the industry resulted in the research fund being augmented by £16,807, exclusive of the D.S.I.R. grant.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specifications (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

AKTIEBOLAGET Gotaverken.—"Turbines." 18800/43. (November 9th, 1942.) (569,579.)

E. Aron and C. H. Vidal.—"Electrically-driven vacuum cleaners." 17539. October 25th. 1943. (569,678.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—"X-ray apparatus." 18002. November 1st, 1943. (569547.)

Chance Bros., Ltd., J. G. Holmes and J. English.—"Cathode-ray bulbs." 1038. January 19th, 1944. (569582.)

H. Da Costa and Plessey, Ltd.—"Step-by-step relay mechanism." 13419. August 18th, 1943. (569670.)

F. B. Dehn (Press Wireless, Inc.).—"Keying arrangements for signalling systems." 11367. July 13th, 1943. (569608.)

Ferranti, Ltd., R. G. B. Gwyer and J. F. Capper.—"Resonant lines for ultra-high radio frequencies." 17285. December 4th, 1940. (569655.)

H. M. Harmer.—"Control means for electrical circuits." 10503. June 29th, 1943. (569600.)

R. C. Henniker and British Power Transformer Co., Ltd.—"Electric voltage regulators comprising inductive windings having a variable number of turns." 13813. August 24th, 1943. (569671.)

Holophane, Ltd. (Holophane Co., Inc.).—"Lighting systems and units for use therein." 9362. May 16th, 1944. (569552.)

Kodak, Ltd. (Eastman Kodak Co.).—"Photo-electric exposure meter." 16400. October 6th, 1943. (Convention date not granted.) (569614.)

Marconi's Wireless Telegraph Co., Ltd., and C. P. Beanland.—"Radio receivers." 17566. October 25th, 1943. (569576.)

Marconi's Wireless Telegraph Co., Ltd., and G. L. Grisdale.—"Tuning arrangements for radio receivers." 16007. September 29th, 1943. (569567.)

J. G. Murdock & Co., Ltd., and B. J. Henderson.—"Frequency-changing apparatus for intercommunicating radio-telephone systems. 12925. August 10th, 1943. (569637.)

Pressed Steel Co., Ltd., and W. S. Simmie.—"Method of electric welding." 16931. October 15th, 1943. (567540.)

Siemens Electric Lamps & Supplies, Ltd., J. N. Aldington and W. G. Creasy.—"Electric discharge lamps." 2903. January 27th, 1939. (569651.)

Swift Levick & Sons, Ltd., and F. W. Tetley.—"Treatment of permanent magnet alloys." 14438. September 21st, 1940. (569654.)

Telephone Mfg. Co., Ltd., and C. O. L. Ward.—"Electrical condensers." 16966. October 15th, 1943. (569571.)

A. A. Thornton (Philco Radio & Television Corporation).—"Explosion-proof battery." 14883. September 10th, 1943. (569612.)

S. F. Warren.—"Method of electric heating for permanently waving hair and apparatus therefor." 12462. July 31st, 1943. (569631.)

D. Weighton and Pye, Ltd.—Detectors or frequency changers for radio-frequency oscillations. 7783. May 17th, 1943. (569562.)

Wright & Weaire, Ltd., and E. S. Buckley.—"Circuit arrangements including interrupters or vibrators." 17353. October 21st, 1943. (569544.)

Trade Publications

Callender's Cable & Construction Co., Ltd.—Two well-produced 64-page booklets dealing with electricity in farming. "Electro-farming with Callender Cables" demonstrates, with the aid of nearly a hundred photographs, how electricity can be used on different classes of farms, mixed, dairy, poultry and mushroom, as well as for piggeries, crop drying and mills. A list is given of the various equipment that electricity can be used to operate. The second publication describes in detail the Callender farm wiring system which has been developed to meet the special conditions encountered in agricultural and horticultural work. Details are also given of the company's Agricultural Advisory Section which is available to users of the Callender wiring system.

Watson & Sons (Electro-Medical), Ltd., 76, Castle Street, Reading, Berks.—Liberally illustrated brochure No. 215 (445) describing the underlying principles of, and apparatus used for, mass miniature radiography of the chest as the means of early diagnosis of tuberculosis. An abridged specification, lay-out suggestions and a list of accessories and materials are included.

Davidson & Co., Ltd., Sirocco Engineering Works, Belfast, Northern Ireland.—Illustrated booklet of 46 pages briefly describing some of the diverse applications of "Sirocco" fan equipment to engineering and allied industries for air conditioning, ventilating and heating, dust collection, fume removal, supplying air to furnaces and boilers, pneumatic conveying plant and portable industrial vacuum cleaning plant.

Sunvic Controls, Ltd., Stanhope House, Kean Street, Aldwych, London, W.C.2.—Illustrated pamphlet (D.P. 1A) with prices and dimensions, describing the "Simmerstat" energy regulator for AC boiling plates of household cookers, also publication (R.12a) describing energy regulators for AC and DC control with circuit diagrams for many applications and particulars of mountings, sizes, dimensions and prices.

Industrix, Ltd., 25, Walpole Street, S.W.3.—An illustrated pamphlet upon the company's permanent sealing plastic for boiler brickwork settings, flues, economisers, etc., production of which has now been recommenced.

Electric Depot, Ltd., Pritchett Street, Birmingham, 6.—Priced leaflet describing the "Lens-Lite" magnifier local lighting bracket for close industrial work.

Applications for these publications should be made on business letter headings.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Burnley.—June 30th. Electricity Department. Supply and delivery of transformers and e.h.v. cables. (June 8th.)

Epsom and Ewell.—July 2nd. Electricity Department. Supply and delivery of high and low voltage cables, paper insulated, lead covered, and armoured. (See this issue.)

Gellygaer.—June 30th. U.D.C. Electricity Department. House service units. (June 1st.)

Hazel Grove and Bramhall. — June 30th. Electricity Department. Three 250-kVA transformers. (June 15th.)

Hull.—July 13th. Electricity Department. Pumps. (June 15th.)

New Zealand. — September 18th. Public Works Department. One 23,000-BHP turbine and 16,667-BHP generator for Waitaki power scheme.

Prestonpans.—July 2nd. Town Council. Various works, including electric lighting, at three blocks of houses and shops. Schedules from R. and A. K. Smith, F.S.I., chartered quantity surveyors, 4, Forres Street, Edinburgh, 3.

Whittingham (near Preston). — June 27th. Committee of Visitors, Mental Hospital. Wiring of farms and buildings. (June 15th.)

Orders Placed

Bradford. — Electricity Committee. Recommended. Extensions at Valley power station: Riddlings, grit and flue dust extraction plant and "Mulsifyre" fire-fighting equipment for Nos. 9 and 10 boiler transformers.—Mather & Platt. 400-V auxiliary switchgear for generators Nos. 5 and 6 and boilers Nos. 9 and 10.—A. Reyrolle & Co. CO_2 fire-extinguishing apparatus for 6,600-V switchgear in turbine room annexe.—Pyrene Co.

Hove.—Electricity Committee. Recommended. Switchgear (£1,264).—Switchgear & Cowans. Transformers (£770).—Electric Construction Co.

Liverpool.—Passenger Transport Committee. Accepted. 180 sets of apparatus and conversion parts for emergency braking equipments on tramcars (£35 per car set).—Metropolitan-Vickers.

Newcastle (Staffs).—Electricity Committee. Recommended. Transformers and switchgear for Sneyd Avenue and Hill Farm substations (£778).—Electric Construction Co.

Stockport.—Electricity Committee. Accepted. Cable (£1,141). — Scottish Cables. Two kiosk shells for housing estates (£1,468).—W. Lucy & Co., Ltd. 750-kW. transformer (£450).—Electric Construction Co.

Warrington. — Electricity Committee. Accepted. Distribution fuse-gear equipment (£1,309).—English Electric Co. 400-A Air-insulated metalclad circuit-breaker (£335).—Ferguson, Pailin.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Permanent houses (48); T. F. Henderson, city engineer, Town House.

Altrincham. — Works extensions, Norman Road; Linotype and Machinery Co., Ltd.

Ayrshire. — Modernisation of works (£600,000); manager, James Finlay & Co., Ltd., cotton spinners, Glasgow.

Barrow - in - Furness. — Rebuilding houses, Undergreens Road and Hawcoat Lane; G. Whitfield.

Belford (Northumberland). — Houses (58); R.D.C. surveyor.

Birkenhead. — Rebuilding Corporation houses (28), Vyner estate; Lloyd & Cross, Ltd., builders, 68, Argyle Street.

Flats (15), New Chester Road, Beaufort Road and Brow Road for Town Council; Furbur & Son, quantity surveyors, Cunard Building, Pier Head, Liverpool, 3.

Extensions for staff accommodation at the Municipal Hospital, Derby Road; L. Barnish, architect, 14, Fair View Road, Oxton.

Birmingham. — Additional accommodation for nursing staff at Yardley Green Road Sanatorium (£17,837), and at West Heath Sanatorium (£9,960); city engineer, The Council House.

Blackpool.—Factory, Mowbray Drive; Blackpool Rope & Twine Co., Ltd.

Coventry.—Junior Technical School, Butts Recreation Ground; D. E. E. Gibson, city architect, 1a, Warwick Row.

Crosby (Cumberland).—Houses (30) for the North-Eastern Housing Association; P. L. Browne, Son and Harding, architects, Pearl Buildings, Newcastle-on-Tyne.

Darlington. — Aluminium household goods factory, Longfield Road; Darlington Castings, Ltd.

Deal.—Houses (50), St. Richard's Road; G. A. M. Gentry, borough surveyor, Municipal Offices, Queen Street.

Derby.—Further houses (100), Roe Farm estate; city engineer, Corporation Offices.

East Lothian. — Houses (38) for County Council; F. W. Hardie, county architect, County Buildings, Haddington.

Falkirk.—Crematorium (£25,000); burgh surveyor, Burgh Buildings, Newmarket Street.

Gateshead.—Houses (100) for the Town Council; borough engineer.

Rebuilding factory on new site; Powell's Products, Ltd., Kells Lane, Low Fell.

Hereford.—Houses (50), Hunderton estate; borough surveyor, Town Hall.

Hoddesdon.—Permanent houses (28), on four sites; surveyor, Urban Council offices, High Street, Hoddesdon, Herts.

Lancaster.—Houses (72), Hare Runs estate; borough engineer, Town Hall, Dalton Square.

Liverpool.—Canteen kitchens:—Rose Lane County School; W. Lothian, builder, 14, Broadgreen Road. Hunts Cross Council School; Rimmer Bros., Ltd., builders, Cheadle Avenue, Stoneycroft. Finch Hall County School; J. E. Bladen, quantity surveyor, 12, Preeson's Row.

Manchester.—Medical clinic for mass radiography centre, Ducie Avenue and Oxford Road (£11,000); G. Noel Hill, city architect, Town Hall.

Dining rooms and kitchens at Benchill Municipal School, and Yew Tree School, Northenden; G. H. Gawler, chief building superintendent, 140, Deansgate, Manchester, 3.

Flats 67/77, High Street, for Blackpool Property Co., Ltd.; A. A. G. Toone, architect, 37, Princess Street, Manchester, 1.

Reconstruction of part of works destroyed by fire; Fugistall, Ltd., chocolate manufacturers; 29, Smedley Lane, Cheetham, Manchester, 8.

Workshop, dining room and kitchen, etc., Shirley Institute, for British Cotton Research Association; J. Gerrard & Sons, Ltd., builders, Pendlebury Road, Swinton, Manchester.

Newcastle (Staffs).—Extensions to coach works; C. F. Wilson & Sons, Ltd., vehicle builders, Lunt Street.

Ongar.—Houses (18), Willingale, Fyfield and Bobbingworth, for R.D.C.; Raymond L. Luck, surveyor, Council Offices, Chipping Ongar, Essex.

Patricroft.—Rebuilding works, Hardy Street; L. Gardner & Sons, Ltd., Patricroft, near Manchester.

Additions, Albion Works, Hall Bank; Sir W. H. Bailey & Co., Ltd., Patricroft.

Rowley Regis.—Maternity hospital (joint scheme with Dudley Corporation); borough surveyor, Old Hill, Cradley Heath.

Sheffield.—Rebuilding houses on Parson Cross and Shirecliffe estates; R. Charlesworth, Ltd., Owlerton; W. Memmory & Son, Ltd., Swallownest, Woodhouse; and Melling Bros., Ltd., Balfour Road, Attercliffe.

Stockport.—Kitchen for 500 at Stepping Hill Hospital; Moston Brick and Building Co., Ltd., builders, Kenyon Lane, Moston, Manchester, 10.

Stretford.—Extensions to Memorial Hospital, Seymour Grove; A. H. Perry, borough engineer, Town Hall.

Boiler house extension, Trafford Wharf Road; Manchester Dry Docks Co., Ltd.

Sturminster.—Houses (32), for R.D.C.; J. Steptoe, clerk, Council Offices, Sturminster Newton, Dorset.

Torquay.—Rebuilding hotel; Palace Hotel Co.

Wallasey.—School canteen, Vaughan Road site; Wilson Allison, borough architect, Town Hall.

Walsall.—Factory extension, Hospital Street; H. D. Jackson Co., Ltd.

Houses (106), Coalpool housing site; M. E. Habershon, borough engineer, Council House, Walsall.

Warrington.—Works additions, Rolleston Street and Park Place; W. Winstanley & Co., Ltd., builders and contractors, Park Place.

West Bromwich.—Houses (48), Harvills Hawthorn estate; John G. Jefferson, borough engineer, Town Hall.

Weymouth and Melcombe Regis.—Houses (28), Goldcroft estate; borough surveyor, 1a, Frederick Place, Weymouth.

Whitley Bay.—Houses (50); A. J. Rousell, U.D.C. surveyor.

Willington (Co. Durham). — Houses (224) Nelson Terrace, for the North-Eastern Housing Association; Page, Son and Bradbury, architects, King Street, South Shields.

Workington. — Factory, Moorclose Road, Saltergate; West Cumberland Industrial Development Co., Ltd.

NEW BOOKS

The Electrical Handbook for Women. By Caroline Haslett, C.B.E., director of the Electrical Association for Women. Fourth edition. Pp. 480; illus. English Universities Press, Ltd., London. Price, 7s. 6d.

Although on account of wartime conditions no attempt has been made in this new edition to revise the book as a whole, certain alterations have been made so as to include references to new developments and to bring the text up to date. In view of the permanent value of the book, the author has wisely not endeavoured to make it topical by incorporating references to wartime restrictions and regulations. Covering in simple language the basic principles of electricity generation and distribution, legislation, tariffs, domestic installations, lighting, heating, water heating, cooking, motor-driven appliances, the home laundry, tracing and repairing faults, etc., the work is proving of great value for instructional purposes in schools and colleges, as well as for technical and housecraft training in the women's services and various branches of youth organisations, etc. A number of good illustrations is included, together with a selection of questions and specimen examination papers for the E.A.W. Housecraft Diplomas.—W.R.C.

Books Received

The Protective Gear Handbook. By M. Kaufmann, M.I.E.E. Pp. 298; figs. 184. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, London, W.C.2. Price 30s.

Electro-plating. By Samuel Field and A. Dudley Weill. Fifth edition, revised and enlarged. Pp. 483; figs. 95. Sir Isaac Pitman & Sons, Ltd.

Modern Plastics. By Harry Barron, Ph.D., B.Sc., F.R.I.C., A.I.R.I. Pp. 680; figs. 250. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price, 42s.

Cutting Tool Practice. By H. C. Town, M.I.Mech.E., M.I.P.E., and D. Potter. Pp. 131; figs. 124. Paul Elek (Publishers), Ltd., Africa House, Kingsway, London, W.C.2. Price 13s. 6d.